



**A qualitative inquiry on the physical, psychological and social effects of the 2022
floods on individuals, families and communities' in
eThekweni, KwaZulu-Natal**

**Submitted in fulfilment of the requirements of the
degree of Doctor of Philosophy in Health Sciences in
the Faculty of Health Sciences at the Durban
University of Technology**

VIKESH SINGH

August 2025

RBhagwan

13.08.25

**Signature of supervisor
Prof. R Bhagwan
PhD**

Date of signature

DECLARATION BY STUDENT

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Durban University of Technology or to any other institution for assessment or for any other purpose. The research described in this thesis was supervised by:

Prof Raisuyah Bhagwan: Professor, Department of Community Health Services, Faculty of Health Sciences, Durban University of Technology, Durban, South Africa.

Vikesh Singh (Student)

____ 10 August 2025 ____
Date

APPROVED FOR EXAMINATION

RBhagwan

Prof. Raisuyah Bhagwan
PhD

13.08.25

Date

ETHICAL CLEARANCE

This is to certify that the study received ethical approval from the Institutional Research Ethics Committee (IREC) of the Durban University of Technology (DUT) in KwaZulu-Natal.

The ethics clearance number is: IREC 283/22

Candidate: Vikesh Singh

Vikesh Singh (Student)

10 August 2025

Date

ABSTRACT

In April 2022, eThekweni metropolitan, situated in the Province of KwaZulu-Natal experienced one of the most devastating floods events in recent history. The heavy rains caused landslides, mass destruction of homes, damages to infrastructure and the displacement of thousands of people. Many communities were affected and homes and businesses washed away, particularly those in informal settlements and homes in low-lying areas. The flooding disaster also affected the transport systems causing businesses to become affected and disrupting people's access to healthcare and schools. Thousands of people were displaced into temporary and long term shelters with limited resources. Whilst the number of floods that have affected human societies has increased globally each year, little empirical research related to how it was experienced in South Africa has been done. This study sought to explore the physical and psychosocial effects of the April 2022 floods on individuals, families and communities, in South Africa as well as the role of faith based organizations within the disaster response and recovery efforts.

A qualitative case study design was used to inform the study process. Non-probability purposive sampling techniques were used to recruit a total of forty-three participants. Four samples were recruited. The first three were community members affected by the floods and residing within an urban area, semi-rural area and an informal settlement. The fourth sample included participants from a Christian, Hindu and Muslim faith-based organisation. Semi-structured interviews were used to gather data which was then analysed using thematic analysis.

The key findings show that participants suffered significant physical hardship including injury, illness and exposure to poor living conditions in the aftermath of their displacement. Families reported the loss of their homes, essential belongings and items of sentiment. The study highlighted that those living in disadvantaged spaces, such as informal settlements, endured the largest losses as their homes were most vulnerable to the heavy rainwaters, as they were built from poor building materials. The floods also damaged

community infrastructure and utilities such as electricity and sanitation, placing community members at risk of health issues. The psychological effects on the participants were also widespread and participants described experiencing substantial levels of sadness, fear, anger and anxiety. Families were displaced and community support was weakened, further affecting the mental health of participants.

Faith-based organizations were found to play a significant role in the response and recovery activities. They mobilized quickly to provide shelter, food, clothing and bedding for those who were displaced. They created safe spaces for weeks and months not only by providing material assistance, but also through offering counselling, prayer and spiritual support, thereby helping individuals and families to process their losses and fostering resilience. The data also showed that the early warning signs associated with weather forecasting were not well communicated to those most vulnerable, as most people were unaware of the impending flood and its dangers.

In conclusion, this study offered rich and insightful perspectives into the lives of those affected by the floods. It reflected the interconnected nature between the physical, psychological, social and spiritual effects of the flood, by showing how damages to homes, livelihoods and the displacement were intertwined with mental health struggles and social isolation. Faith based organizations filled a critical gap in service provision and contributed meaningfully to the disaster response and recovery. This study will contribute to the disaster management policies and strategies in eThekweni and South Africa, through its holistic findings, on how individuals, families and communities were affected and the role played by local government and community organizations in responding to the disaster.

DEDICATION

This thesis is dedicated to:

All those lives who were affected by the April 2022 floods and to all those who provide support to the affected people.

My mother for her unwavering support.

To the Almighty, for granting me the strength, clarity and perseverance to complete this journey.

ACKNOWLEDGMENTS

I wish to express my appreciation to the many individuals and organizations who have made my Doctoral study, a reality. My appreciation is extended to:

Prof. Raisuyah Bhagwan who supervised this study. Thank you for your commitment to ensuring my excellence, your patience and support throughout this process. Your ongoing mentorship has improved my academic growth and has inspired me.

The research participants for their efforts and information provided, which led to the completion of this study.

I also acknowledge the support of the faith-based organisations and the invaluable knowledge from the faith-based participants.

Finally, my family for their constant support, patience and understanding.

TABLE OF CONTENTS

DECLARATION BY STUDENT	i
ETHICAL CLEARANCE	ii
ABSTRACT	iii
DEDICATION	v
ACKNOWLEDGMENTS	vi
TABLE OF CONTENTS	vii
LIST OF APPENDICES	xv
LIST OF TABLES	xvii
LIST OF FIGURES	xviii
CHAPTER 1: BACKGROUND OF THE STUDY	1
1.1 Introduction	1
1.2 Natural Disaster in its context	3
1.2.1 The South African context	3
1.3 Overview of the Event	5
1.4 Causes of the April 2022 flood	5
1.5 Effects of the April 2022 flood in Ethekekwini	6
1.5.1 Infrastructural and environmental damage	6
1.5.2 Impact of the floods on humankind	10
1.5.3 Displacement of people	11
1.5.4 Mental health sequelae on individuals post the floods	12
1.5.5 Preparedness for floods	13
1.5.6 The role of humanitarian organizations	14

1.6 Problem statement.....	15
1.7 Rationale for the study	16
1.8 Aim and objectives	19
1.8.1 Aim:	19
1.8.2 Objectives:	19
1.8.3 Research questions	20
1.9 Theoretical framework.....	20
1.10 Research methodology	23
1.11 Structure of dissertation	24
1.12 Conclusion	25
CHAPTER TWO: LITERATURE REVIEW	26
2.1 Introduction	26
2.2 Sourcing the literature	27
2.3 Natural disasters in its context	27
2.4 The vulnerability of humankind to natural disasters	29
2.4.1 Age	29
2.4.2 Gender disparities.....	32
2.4.3 Disabilities.....	33
2.4.4 Socio-economic aspects	34
2.4.5 Informal settlements	36
2.5 The nature of loss after a natural disaster.....	38
2.6 Preparedness for natural disasters	40
2.7 Physical health effects of natural disasters	42
2.8 Psychological effects of natural disasters	43

2.9 Global view of floods	46
2.10 Flooding in the South African context	49
2.11 Effects of flooding	52
2.11.1 Environmental and infrastructural effects.....	54
2.11.2 Disruption to families and displacement.....	56
2.11.3 Food insecurity	59
2.11.4 Physical Health and Mortality.....	61
2.11.5 Psychological impact of flooding.....	64
2.12 The effects of flooding on children	67
2.13 Effects of flooding on families	70
2.14 Effects of flooding on communities	74
2.15 Community recovery	78
2.16 Faith-based organizations.....	79
2.16.1 Role of faith-based organisations during natural disasters	80
2.17 Faith-based organisations in South Africa.....	83
2.18 Social support	84
2.19 Conclusion	87
CHAPTER 3: RESEARCH METHODOLOGY	89
3.1 Introduction	89
3.2 Research Design	89
3.3 Qualitative research method	90
3.3. 1 Research Approach: Instrumental case study	93
3.3.1.1 Defining the case.....	94
3.4 Research Paradigm	98

3.4.1 Interpretivism	99
3.5 Researcher's role and reflexivity	101
3.6 Study Setting.....	104
3.7 Research population	105
3.8 Research samples	106
3.8.1 Definition of Sample.....	106
3.8.2 Purposive sampling	107
3.9 The study sample.....	108
3.9.1 The sampling process.....	108
3.9.1.1 Sample 1: People living in Lamontville	111
3.9.1.2 Sample 2: People living in Tongaat	111
3.9.1.3 Sample 3: People living in Crossmoor informal settlement.....	112
3.9.1.4 Sample 4: Members of the Christian, Hindu and Muslim faith-based organisation.....	112
3.9.2 The recruiting process	113
3.9.2.1 Samples 1 to 3: Community members.....	113
3.9.2.2 Sample 4: Faith based leaders	114
3.10 Data Collection Methods	115
3.10.1 Semi-structured interviews: samples one to four	117
3.10.2 Data collection tool	118
3.10.3 Pilot Study.....	120
3.10.4 Procedure for data collection	121
3.10.4.1 Samples 1 to 3: community members	121
3.10.4.2 Leaders of the faith-based organisations (Sample 4)	123
3.11 Data Analysis	124
3.11.1 Thematic analysis	124

3.12 Trustworthiness.....	128
3.12.1 Credibility	128
3.12.2 Transferability	129
3.12.3 Dependability	129
3.12.4 Confirmability	130
3.13 Expert validation committee	131
3.13.1 Selection of the Expert Validation Committee	131
3.13.2 Meeting: Method and Review of Themes	132
3.13.3 Feedback and refinements	132
3.14 Ethical considerations	135
3.14.1 Ethical approval	135
3.14.2 Informed Consent	136
3.14.3 Confidentiality and Anonymity.....	137
3.14.4 Minimizing risk of harm (Beneficence)	137
3.15 Conclusion	138
CHAPTER 4: ANALYSIS AND DISCUSSION OF FINDINGS.....	139
4.1 INTRODUCTION.....	139
4.2 Thematic analysis	139
4.3 Research objectives and analysis themes	140
4.4 Demographic profile	142
4.4.1 Gender profile	145
4.4.2 Age distribution	145
4.4.3 Housing design structure	145
4.4.4 Marital status	146

4.4.5	Occupation	146
4.5	Section B: Analysis and discussion of findings.....	146
4.6	THEMES	147
4.6.1	Theme 1: Experience of the floods	149
4.6.1.1	Sub-theme 1: Personal experience of the floods	149
4.6.1.2	Sub-theme 2: Housing structures and the impact	157
4.6.1.3	Sub-theme 3: Loss of belongings and documents	162
4.6.1.4	Sub-theme 4: Vulnerable households	168
4.6.1.5	Sub-theme 5: Impact on community infrastructure and utilities	172
4.6.2	Theme 2: Impact on physical health	174
4.6.2.1	Sub-theme 1: Physical injuries related to the floods.....	175
4.6.2.2	Sub-theme 2: Chronic health conditions	177
4.6.3	Theme 3: Mental Health Sequelae	179
4.6.3.1	Sub-theme 1: Acute fear and anxiety	179
4.6.3.2	Sub-theme 2: Fear	183
4.6.3.3	Sub-theme 3: Sleep disturbances and flashbacks	185
4.6.3.4	Sub-theme 4: Sadness and depression	186
4.6.4	Theme 4: Life in a shelter	188
4.6.4.1	Sub-theme 1: Initial relief and support.....	188
4.6.4.2	Sub-theme 2: Experience of living in the flood relief shelter.....	192
4.6.4.3	Sub-theme three: Life in shelters and the impact on physical health	194
4.6.4.4	Sub-theme four: Alcohol use and disruptive social behaviour	195
4.6.4.5	Sub-theme 5: Psychological effects of displacement	197
4.6.5	Theme 5: Role of religious organisations.....	200
4.6.5.1	Sub-theme 1: Religious philosophy underpinning faith-based organizations	200
4.6.5.2	Sub-theme 2: Instruments of humanitarian aid	202
4.6.5.3	Sub-theme 3: The impact of the floods through the lens of faith leaders	205

4.6.5.4	Sub-theme 4: Nature of humanitarian aid	212
4.6.5.5	Sub-theme 5: Spiritual support provided	218
4.6.5.6	Sub-theme 6: Things that could have been done differently	223
4.6.6	Theme 6: Community Support.....	225
4.6.6.1	Sub-theme 1: Formal support of community	225
4.6.6.2	Sub-theme 2: Informal support received	229
4.6.6.3	Sub-theme 3: Personal prayer and religiosity as a coping mechanism 230	
4.7	Conclusion	231
CHAPTER 5: CONCLUSION AND RECOMMENDATIONS.....		232
5.1	Introduction	232
5.2	Major findings of the study	232
5.2.1	The experiences of individuals and their families during the floods	232
5.2.2	The physical and psychosocial effects of the floods on individuals and families	235
5.2.3	Impact on the physical circumstances of flood victims.....	238
5.2.4	Role of faith-based organizations in supporting families.....	241
5.3	Key conclusions	244
5.4	Recommendations	246
5.4.1.	Mitigation	246
5.4.1.1	Physical infrastructure and urban planning.....	246
5.4.1.2	Improvement of temporary shelters	249
5.4.2	Preparedness	249
5.4.2.1	Early warning systems and community awareness	250
5.4.3	Response and recovery	251
5.4.3.1	Mental health services.....	251
5.4.3.2	Community support systems	253

5.4.3.3 Social support organizations	254
5.4.3.4 Faith based organizations	254
5.4.3.5 Establish rapid response protocols	256
5.5 Recommendations for future studies	257
5.6 Contribution of the study	257
5.7 Limitations of the study	258
5.8 Conclusion	260
REFERENCES.....	261

LIST OF APPENDICES

Appendix 1a: Letter of information in English Participants from the community.....	390
Appendix 1b: Letter of information in isiZulu Participants from the community.....	393
Appendix 2: Letter of information Faith-based organisations.....	396
Appendix 3a: Letter of Consent in English.....	399
Appendix 3b: Letter of consent in isiZulu.....	400
Appendix 4: Letter of consent.....	401
Appendix 5a: Letter to the gatekeeper: Lamontville.....	402
Appendix 5b: Letter to the gatekeeper: Tongaat.....	403
Appendix 5c: Letter to the gatekeeper: Crossmoor Informal Settlement.....	404
Appendix 5d: Letter to the gatekeeper - Christian faith-based organisation.....	405
Appendix 5e: Letter to the gatekeeper – Muslim faith-based organisation.....	406
Appendix 5f: Letter to the gatekeeper: Hindu faith-based organisation.....	407
Appendix 6a: Interview guide in English– Participants from the community.....	408
Appendix 6b: Interview guide in isiZulu– Participants from the community.....	410
Appendix 6c: Interview guide in English – Faith-based organisations.....	412
Appendix 7: Ethics approval (IREC).....	413
Appendix 8a: Gatekeeper Approval: Lamontville.....	414
Appendix 8b: Gatekeeper approval: Tongaat.....	415
Appendix 8c: Gatekeeper approval: Crossmoor Informal settlement.....	416

Appendix 8d: Gatekeeper approval: Christian faith-based organisation.....	417
Appendix 8e: Gatekeeper approval: Muslim faith-based organisation.....	418
Appendix 8f: Gatekeeper approval: Hindu faith-based organisation.....	419

LIST OF TABLES

Table 3.1 Interpretivist research philosophy	100
Table 3.2 Population One: Community members	105
Table 3.3 Population Two: Faith based members	106
Table 3.4: Samples and sample sizes	110
Table 3.5: Interview guides for each sample	119
Table 3.6: Excerpts from the validation committee	133
Table 4.1 Objectives and themes	140
Table 4.2 Demographic profile of participants	142
Table 4.3 Demographic profile of participants from the faith-based organisations	144
Table 4.4 Research objectives	147
Table 4.5 Main themes and sub-themes	147

LIST OF FIGURES

Figure 2.1: Global distribution of disaster	28
Figure 2.2: Biopsychosocial response pattern and temporal phases of disaster	44
Figure 2.3: Impact of floods showing flood loss classification	53
Figure 3.1: Location of eThekweni in KwaZulu-Natal, South Africa	95
Figure 3.2 Diagram of eThekweni district as the instrumental case with study sites and participants.....	98
Figure 3.3 The reflexive thinking process	103

CHAPTER 1: BACKGROUND OF THE STUDY

“We learn from every natural disaster. Whether it’s a fire or a flood, we learn something from it so we can respond to the next one better” (*Malcolm Turnbull 2025*)

1.1 Introduction

In contemporary times the planet has been besieged by an unprecedented level of natural disasters. Natural disasters such as floods, tsunamis and earthquakes are major adverse events occurring from natural processes of the earth (Cutter, Emrich, Mitchell, Boruff, Gall, Schmidtlein, Burton and Melton 2006: 8). These natural disasters reflect the power of nature against the fragility of humankind, causing substantial human damages, depending on the intensity, exposure and vulnerability of those affected (Bouchard, Pretorius, Kramers-Olen, Padmanabhanunni and Stiegler 2023 :235).

Climate change and global warming have been identified as key contributory factors to flooding events, bringing catastrophic consequences for all. Floods are a major source of anthropological and ecological destruction, affecting socio-economic conditions, exacerbating public health, and causing damage to the eco-system (Parida and Dash 2020: 486). As the world grapples with the massive impacts of climate change and global shifts in hydrological cycles, scholars have argued that South Africa has become increasingly vulnerable to climate change (Scholes and Engelbrecht 2021 :1).

The Province of KwaZulu-Natal in particular has experienced several flooding events, with torrential rain battering the Province, especially the coastal areas bringing with it devastating effects (Mudefi 2023: 1). The extreme rainfall and flooding have been described as the deadliest record in South Africa, with fatalities at 435 and a considerable number of people unaccounted for in April 2022 (Jewkes, Gibbs, Mkhwanazi, Zembe, Khoza, Mnandi, and Washington 2023: 3). According to the United Nations Disaster Risk Reductions, floods are responsible for more than half of the fatalities related to disasters and a third of the economic losses globally (Udo and

Naidu 2023: 2). Flooding events cause widespread destruction not just to homes, businesses, roads and infrastructure, but also result in high fatality rates, physical injuries and psychosocial trauma (Bouchard *et al.* 2023: 236; Makwana 2019: 1).

Three decades after the birth of the new democracy, South Africa still bears the scars of the apartheid legacy (Marutlulle 2022: 1). Inequities within the South African context are mirrored along racial divides, which are exacerbated by intergenerational poverty, barriers to accessing health, welfare and education. The high levels of poverty have not only resulted in a high unemployment rate, but also a housing crisis (Dlamini, Nhleko and Ubisi 2024: 2; Marutlulle 2022: 1). Many seek jobs in urban areas, which has led to an increased number of informal settlements, that have become vulnerable to climate related disasters, particularly flooding (Dlamini *et al.* 2024: 1). However, the wrath of the floods has not confined itself to disadvantaged communities, but has transcended the socio-economic status, age and gender boundaries to affect those across all divides (Hattingh 2022: 2). The unique geology of eThekweni is characterized by high terrains, which are intersected by major rivers and streams, thereby exacerbating the effects of the heavy rainfall, resulting in the destruction of many homes due to mudslides, landslides and rushing water, as during the 2022 floods (Hattingh 2022: 2).

This chapter forms the foundation of this study, by introducing the background to the study and placing the Province of KwaZulu-Natal in its context. An overview of floods, both within the global and local context is sketched, by drawing on existing literature to highlight the key findings of prior research. This solidifies the problem statement and research problem, by establishing the lack of empirical work related to this disaster and the need for a deeper understanding of the multidimensional impact of the April 2022 floods and the measures required to support individuals, families and communities during such events. The theoretical framework, the biopsychosocial and spiritual model, that guides the study is presented, providing a structured lens through which the findings are understood. This framework enabled a holistic understanding of the complexities of the flooding experience and how it affected people not just physically, but also psychologically and socially. It offered a more meaningful pathway to identifying the multifaceted needs of individuals, families and communities

transitioning through a disaster and to identifying the strategies required to better support those individuals, families and communities affected. The chapter concluded by presenting an outline of the structure of the other chapters that follow. The subsection that follows, places natural disasters in their context.

1.2 Natural Disaster in its context

The United Nations Office for Disaster Risk Reductions defined a disaster as a serious disruption to the functioning of a society, that suffers from losses and endures impact to its human, material, economic and environmental aspects (United Nations Office for Disaster Risk Reduction 2017a: 1). This outweighs the ability of affected communities to use their resources to survive and thrive (Sunarti, Gunawan, Widiyantoro, Marliyani and Ida 2021: 923). Mugabe, Gudo, Inlamea, Kitron and Ribeiro (2021: 1) argued that natural disasters are linked to many humanitarian crises, as they erode development and create massive public health challenges. Prayag, Ozanne and Spector (2021: 7) added that disasters disrupt human life significantly, causing damage and loss, adversity and deterioration which is experienced by many both directly and indirectly. The health and wellbeing of people is threatened as damage occurs to infrastructure (such as water, sanitation and energy supply systems, housing and health facilities); shortages to food supplies, starvation, the displacement of families, increased risk of injuries and deaths as well as an upsurge of communicable diseases (Witt, Sachser and Fegert 2022: 653).

1.2.1 The South African context

The colonial apartheid system, which entrenched itself over decades across societal, legislative and socio-economic and racially segregated lines, still characterises much of contemporary South Africa (Ntombela and Jili 2020: 85). Historical inequities in South Africa are reflected within racial contexts and have been exacerbated by intergenerational poverty and barriers to accessing education, skills, health and welfare. Whilst most Black South Africans reside in large informal settlements on the outskirts of cities, a disproportionate number of such settlements, however can be found in rural spaces which are bereft of much needed infrastructure (Bouchard *et al.*

2023: 240). The ability of these marginalised and disadvantaged communities to withstand flooding events and recover from the aftermath of these disasters is influenced by socio-spatial discrepancies and inequities related to income, age, education and access to services which reflects much of the South African landscape (O'Hare and White 2018: 1). Consequently, South Africa as a developing country, has limited preparedness and capacity to respond effectively to natural disasters.

The Province of KwaZulu-Natal Province in South Africa, is the second largest populated Province with approximately 11.8 million people (Statistics South Africa 2022: 2). Of this 3.5 million reside within the eThekweni municipality (Pinto, Zachariah, Wolski, Landman, Phakula, Maluleke, Bopape, Engelbrecht, Jack and McClure 2022: 2). A large proportion of the residents are from low-income households (South Africa, Department of Cooperative Governance and Traditional Affairs 2021: 5). As a result of apartheid and spatial planning, much of eThekweni is still riddled with governance challenges, an old and weakened infrastructure, a growth in the number of informal settlements and an absence of efficient early warning systems with regards to natural disasters (Singh, Thalheimer, van Aalst, Li, Sun, Vecchi, Yang, Tradowsky, Otto and Dipura 2022 cited in Ngcamu 2023: 2). Recently many communities have been affected in the Province, through floods which have become increasingly frequent and intense. Flooding in eThekweni area, has therefore escalated and created immense disruptions to families and communities, due to the number of vulnerable households that were displaced, during the disaster resulting in a climatic scenario of catastrophic proportions.

In April 2022, the Province of KwaZulu-Natal experienced one of its most devastating flood events in recorded history. Over the course of several days, intense rainfall resulted in widespread flooding across the region, impacting eThekweni, the Provincial metropolitan, and surrounding areas (Ebhuoma, Nene and Leonard 2024: 1). The floods were not only catastrophic, due to the extensive loss of life and property, but it brought to the fore the vulnerability of infrastructure and communities within South Africa, due to increasing hazardous weather events (Mudefi 2023: 1). The April 2022 floods were part of a larger pattern of extreme weather events, linked to climate change, which has increasingly put regions around the world at risk of similar disasters

(Bouchard *et al.* 2023: 234). The sub-section that follows provides an overview of the event, the causes and effects of the floods and the role played by faith-based organizations in the aftermath of the disaster.

1.3 Overview of the Event

The rainfall event that led to the flooding in KwaZulu-Natal, began on the 8th of April 2022, continuing for several days, with the heaviest rainfall occurring between the 11th and 12th of April 2022 (Grab and Nash 2023: 3). The Province received over 75% of the country's annual rainfall, with approximately 300 millimetres of rain falling in certain areas, in just one day (Bouchard *et al.* 2023: 236). This intense rainfall, coupled with pre-existing saturated soil conditions (Hattingh 2022: 26), led to catastrophic flooding together with landslides and mudflows (Grab and Nash 2023: 3), particularly in eThekweni and its surrounding towns. The floodwaters overwhelmed a fragile and already weakened infrastructure, destroying homes, businesses, and roads, causing a significant loss of life (Mudefi 2023: 1). The human toll of the disaster was therefore significant, with reports reflecting that over 400 people had died, as a direct result of the flooding (Ebhuoma *et al.* 2024: 1; Bouchard *et al.* 2023: 236). President Cyril Ramaphosa declared KwaZulu-Natal a disaster area and described the floods as “a catastrophe” (Erasmus 2022: para. 1 line 1). The Minister of Disaster management noted that they were the “worst floods that had ever been seen in living memory” (Mayalo 2022: para. 3 line 1). The devastating impact of the floods in KwaZulu-Natal, highlighted the urgent need to understand the underlying factors that contributed to this devastating event. The causes of such flooding events are presented in the sub-section that follows, providing an understanding of the factors and issues requiring attention to mitigate such events.

1.4 Causes of the April 2022 flood

The primary cause of the floods in KwaZulu-Natal, was linked to the formation of a low-pressure system off the east coast of South Africa called Issa, which brought heavy rains and strong winds (Hattingh 2022: 24). The World Weather Attribution Group indicated that the event was as a result of anthropogenic induced climate

change, which had caused the floods to be more intense (Grab and Nash 2023: 3). Additionally, the rainfall was so intense that the Shongweni Dam, which is about 15km from the eThekweni central area, had to open two of its gates to prevent the dam wall from bursting. The resultant overflow caused flooding on the highways, coastal plains and the South industrial areas (Hattingh 2022: 25).

Urbanization, particularly in eThekweni, also contributed to the severity of the floods and the erosive impact of flood water (Letsatsi and Kruger 2022: 9). The rapid growth of the population in the city, has led to the expansion of informal settlements, in flood-prone areas or on steep slopes, which lack adequate infrastructure, drainage systems and are characterised by a high level of unstable soil (Letsatsi and Kruger 2022: 9). Additionally, there has been an increase in suburban developments of housing estates and other high concentration residences (Thinane, Masuku and Baloyi 2023 7). The lack of proper planning and maintenance of drainage systems caused localized flooding, as the water had nowhere to flow, exacerbating the damage within residential areas and commercial districts (Grab and Nash 2023: 17; Letsatsi and Kruger 2022: 9).

The subsection that follows, delves into the effects of the floods. The damages caused are explored, as well as the physical and psychosocial effects on people.

1.5 Effects of the April 2022 flood in Ethekewini

1.5.1 Infrastructural and environmental damage

The impact of a flood includes both physical and non-physical damages. Physical effects are visible within infrastructural and damage to the environment. The floods created widespread destruction across eThekweni and its surrounding areas (Thoithi, Blamey and Reason 2022: 1) and caused extensive economic effects (Bouchard *et al.* 2023: 236). Roads and bridges were washed away, residential areas were submerged, and critical infrastructure, related to electricity and water supply systems were severely damaged (Bouchard *et al.* 2023: 236; Jewkes *et al.* 2023: 1). Over 100 power stations were damaged leaving large parts of eThekweni in darkness (Zondi 2022: para. 7 line

1). The floods also caused major disruptions to transportation networks and local economies, affecting the agricultural sector, which is a vital component of KwaZulu-Natal's economy in particular (South Africa Government 2022a: 1). These damages not only hindered daily life but posed long term challenges with regards to recovery efforts.

The floods also caused substantial damage to water supply and sewage systems. The destruction of the Tongaat Water Treatment Works, disrupted the supply of clean water provision substantially, affecting large parts of eThekweni, while the damage to sewage systems led to spillage in the ocean. This also exacerbated the risk of water contamination and other public health issues (Mashego 2022: 3). Four months after the event, the restoration of sanitation services was nowhere near completed, severely hindering the provision of clean water to communities, thereby escalating the challenges within the region (Mashego 2022: 3).

Jewkes *et al.* (2023: 1) reported that one hundred and twenty-four schools and over 13 500 houses, were damaged or destroyed. Of this number 4000 homes were within informal settlements. Homes in informal settlements are commonly referred to as “shacks,” and are vulnerable structures, built with materials such as wood, cardboard, metal pieces and mud, that lack storm water drainage (Dlamini *et al.* 2024: 2). Mudefi (2023: 1) noted that thirty-four clinics and twenty-three hospitals endured infrastructural damages. eThekweni, as a major economic hub, also suffered significant losses, with damage to industrial infrastructure and port facilities, leading to disruptions in supply chains (Bouchard *et al.* 2023: 236; South Africa, Department of Public Enterprises 2022: 10). The storm also affected the rail network resulting in cessation of the train operations. Due to the velocity of loose debris lines were washed away, coupled with infrastructure failures and electrical sub-station challenges. This hampered the movement of containers, fuel, gas, timber and general freight (South Africa, Department of Public Enterprises 2022: 10). In addition, the Department of Trade, Industry and Competition reported that over 826 businesses were affected by the floods (South African Government 2022b: 1). One such business was Toyota, with the Premier of KZN reporting that the damage to the company had resulted in its temporary closure, leaving an estimated 30 000 employees across the manufacturing

industry out of work currently (South African Government 2022b: 1). The Auditor General's report highlighted that the economic recovery would require large investments in rebuilding efforts, which would be complicated by the long-term nature of the damage (Auditor General South Africa 2022: 1).

Floods are one of the most destructive climate related threats to physical infrastructure. This includes threats to roads, communication networks, buildings, and public services (Njogu 2021: 1). Infrastructure that is underground is often unseen by the public eye but is nonetheless crucial to upholding the functioning of a community. These structures provide key amenities including the supply of water via pipes, disposal of sewage, energy distribution, and telecommunication (Wang and Yin 2022: 2; Kaur, Hewage and Sadiq 2021: 1). A review of the literature found that infrastructure, which is less visible, is more vulnerable to destruction during flooding events, such as hurricanes and storms (Abegaz, Xu, Wang and Huang 2024: 2). The destruction of the infrastructure has considerable consequences for community making it important to build their resilience and reduce potential damages (Abegaz *et al.* 2024: 6).

A study conducted by Adger, de Campos, Siddiqui, Gavonel, Szaboova, Rocky, Bhuiyan and Billah 2021 (cited in Chohan, Awad, Jung and Sher 2024: 3) provided an in-depth understanding of how climate change, impacted housing and human settlements. Their study highlighted how climate change had increased the vulnerability of housing to extreme weather events, such as hurricanes, floods, heatwaves, and wildfires. As these events become more frequent and intense, the structural integrity and resilience of homes were severely challenged, thereby jeopardizing the safety and well-being of residents, placing a significant financial burden on homeowners, tenants, and the authorities responsible for the repair or reconstruction of affected properties.

Mohd, Mohamed Saraf, Che Pin, Hasbullah, Nordin and Ismail (2016: 2) assessed the degree of housing damage following floods in Malaysia and found that the destruction to homes varies according to the structural material of the home, the severity of the rain and floods. The destruction ranged from minor damage such as cracks to the walls and roofs, to major damage in which the walls, roofs and foundation were washed

away, to complete destruction where the entire home was washed away or where there was impending collapse or total destruction of the home (Mohd *et al.* 2016: 4). Such impacts are particularly severe in informal settlements, where housing quality is already poor, and residents are more vulnerable to environmental hazards (Anwana and Owojori 2023: 4).

Flooding also significantly disrupts transportation infrastructure, particularly roads. The physical damage to road networks is a major issue in flood-prone regions, as extensive flooding can wash roads away or render them impassable (He, Thies, Avner and Rentschler 2020: 2). A study conducted in Kinshasa in the Republic of Congo, found that the destruction to transportation networks had affected communities, with route diversions and increased travel delays which resulted in significant economic costs for local commuters (He *et al.* 2020: 22). In addition, the damage reduced access to businesses and hindered employment opportunities especially amongst low-income populations who are already confronted with socio-economic challenges (He *et al.* 2020: 21).

Electricity infrastructure is another critical area of concern during flood events. Floodwaters often damage power plants, transformers, and transmission lines, leading to widespread power outages (eThekwini municipality 2023: 9; Mudefi 2023: 1; Waseem and Manshadi 2020: 2). A study by Wang, Josephs, Duan and Gong (2024: 6) highlighted the vulnerability of energy systems to flooding, particularly in coastal regions where rising sea levels and extreme weather events, have become more common. The loss of electricity not only disrupts daily life, but also hampers recovery efforts, as it affects communication, water treatment facilities, and healthcare services (Naidoo, Manyangadze and Lokotola 2022: 1-2). The restoration of electricity infrastructure following natural disasters can take weeks or even months, depending on the severity of the disaster (Karagiannis, Chondrogiannis, Krausmann and Turksezer 2017: 28).

While the broader literature highlights the destructive effects of floods on infrastructure globally, the 2022 floods in eThekwini presents a unique scenario, due to its socio-economic context and specific infrastructural vulnerabilities. This study, therefore,

seeks to understand how individuals, families and communities were affected in the eThekweni district.

1.5.2 Impact of the floods on humankind

Flooding events can result in casualties such as increased deaths, injuries as well as mental health sequelae, such as stress and depression (Sunarti *et al.* 2021: 923). The human toll of the disaster in KwaZulu-Natal was severe, with more than 450 fatalities, being reported in low-lying areas and informal settlements, that were disproportionately affected by the floods (Mudefi 2023: 1; Thoithi *et al.* 2022: 1). The high death toll was attributed to the rapid onset of the floods, with many individuals unable to evacuate on time. Furthermore, poor living conditions in informal settlements, where homes lack proper foundations contributed to the high fatality rates in these spaces (Dlamini *et al.* 2024: 1). In fact, over one hundred people were injured or missing during the April 2022 floods (Jewkes *et al.* 2023: 1).

A study by researchers from Monash University, synthesized epidemiological evidence from thirty-seven studies published between 2000 and 2023. They found that exposure to floods, had increased the risks of gastrointestinal diseases, diarrhoea, dysentery, malaria, and respiratory diseases (Yang, Huang, McKenzie, Yu, Ju, Wu, Wen, Guo and Li 2024: 12). The researchers also recognized that more research was required, in low-income countries that focused on vulnerable populations, different climates and locations (Yang *et al.* 2024: 12). A review of articles from 2000 to 2019, that was conducted by Shokri, Sabzevari and Hashemi (2020: 3), found that flooding events can increase the risk of various diseases including vector-borne, viral respiratory, gastrointestinal and soft tissue infections with issues arising from direct exposure to pathogens (e.g. wound infections, pneumonia), overcrowded shelters (e.g. tuberculosis, influenza), lack of clean water (e.g. cholera and diarrhoea) and stagnant waters. Another study conducted by Huang, Wang, Wu, Chen and Huang (2016: 5) which used data from the National Health Insurance records of one million people, found that the occurrence of eye, skin and gastro-intestinal tract illnesses, were higher ten days post a flooding event. This was possibly due to the inconvenience of seeking care during the flooding event.

Pinto *et al.* (2022: 2) argued that vulnerable populations such as the elderly, women and children and people with disabilities are disproportionately affected by flooding events. The April 2022 floods largely impacted poorer populations, and marginalised communities particularly internal migrants (Pinto *et al.* 2022: 2).

1.5.3 Displacement of people

The April 2022 floods displaced over 40 000 people in the Province of KwaZulu-Natal (Mudefi 2023: 1; Thoithi *et al.* 2022: 1), forcing them into temporary shelters, which were provided by the government, communities and non-governmental organizations. Many people were left without access to essential services such as clean water, food, and sanitation (Bouchard *et al.* 2023: 236; Jewkes *et al.* 2023: 2). Displaced people and families were housed in various dwellings across eThekweni such as mass care centres, community halls, transit camps (KwaZulu-Natal, Department of Human Settlements 2022: para. 2 line 2), churches and school halls (Medecins Sans Frontieres 2022: para. 2 line 1).

Studies found that the destruction caused to infrastructure and property left many affected people without homes and safe and clean running water (Jewkes *et al.* 2023: 3; Njogu 2021: 5; Sheldon and Zhan 2019:32; Dube, Mtapuri and Matunhu 2018: 2). Family life was disrupted as families were placed in emergency relief shelters for safety and a space to recover from the trauma they had experienced (Bashawri 2019:154). Kakinuma, Puma, Hirabayashi, Tanoue, Baptista and Kanae (2020: 1) mapped the potential exposure to floods and observed flood related evacuations and found that strengthening the resilience of communities to natural disasters was crucial as population displacement compromised human security. Their study further found that African countries could be at a higher risk of experiencing displacements, due to flood afflicted communities experiencing lower levels of income.

Ajodhia and Makhanya (2024: 610) conducted a study on displaced women living in shelters. They found that these women had suffered numerous challenges including a lack of privacy, lack of clothes, toiletries, bedding and nappies for babies. These

challenges resulted in feelings of hopelessness and created adverse psychological reactions amongst them (Ajodhia and Makhanya 2024: 612). Exposure to stressors experienced in shelters following a disaster can therefore significantly affect mental health. Such stressors include the absence of essential services like housing, clean water, electricity, and sanitation (Bouchard *et al.* 2023: 238).

1.5.4 Mental health sequelae on individuals post the floods

Human fragility is revealed in the face of nature's overwhelming power to wreak immense human suffering (Bouchard *et al.* 2023: 236). The effects of natural disasters such as flooding, are far-reaching and the trauma experienced by affected people have profound implications not just on their physical health but their mental health and emotional well-being (Meltzer, Zacher, Merdjanoff, Do, Pham and Abramson 2021: 8; Wani, Suhaff, Khan and Teli 2020: 27; Matthews, Longman, Berry, Passey, Bennett-Levy, Morgan, Pit, Rolfe and Bailie 2019: 367).

Traumatic events such as domestic violence, robberies, looting, poverty, are some of the traumatic experiences that South Africans have been exposed to, which have increased the chance of post-traumatic stress disorders amongst them (Bovey, Hosny, Dutray and Heim 2024: 2). In this context, individuals affected by the flooding events may be at greater risk of experiencing negative psychological effects (Bouchard 2023: 238). In addition, people who were caught unaware, with no warning of the flood were more likely to experience post-traumatic stress disorder and depression (Munro, Kovats, Rubin, Waite, Bone, Armstrong, Beck, Amlôt, Leonardi and Oliver 2017: e134).

In an international context, a cross-sectional survey of adults conducted six-months after a flooding event in Australia, found that almost 22% of the respondents had reported being distressed about the flood, 16% experienced anxiety, 15% had post-traumatic stress disorder or depression and 7% presented with suicidal ideation (Matthews *et al.* 2019: 367). The study also found that participants who had experienced socio-economic marginalization, prior to the floods were more likely to have a higher risk of psychological morbidity following a flooding event. Other

researchers described grief and depression as other psychological sequelae emerging from exposure to a flooding event (Wani *et al.* 2020: 27; Thomas, Prakash, Kulkarni and Murthy 2019: 3; Neelofar, Qadri and Bhat 2018: 3). In a study in India 50% of the participants, were found to experience painful recollections of the flood (Mathew, Varghese, Sabu and Joseph 2021a: 462). Jewkes *et al.* (2023: 2) reported on the effect of climate change on disasters and mental health in low income and middle-income countries and discovered a correlation between exposure to a disaster and mental health, especially amongst low-income communities. Most of these studies however were conducted in Asia, with research in Africa however being sparse (Jewkes *et al.* 2023: 2). Deglon, Dalvie and Abrams (2023: 1) conducted a scoping review, to evaluate the mental health effects linked to unfavourable weather events in Africa from 2008 to 2021. Their study discovered a connection between negative mental health outcomes and weather events within communities, that were affected. However, according to Deglon *et al.* (2023: 11) there is a paucity of research that addresses these factors specifically. Moreover, there is a dearth of qualitative studies that captures the experiences of affected populations. The sub-section that follows, focuses on the preparedness of communities for floods and the role that faith-based organizations played in provisioning humanitarian aid during this disaster.

1.5.5 Preparedness for floods

Mudefi (2023: 16) argued that because of poor disaster preparedness, the response to the April 2022 floods was ineffective. Other researchers similarly noted that the preparedness of a community affects their vulnerability, and the risks linked to loss of lives, property, access to food and water (Odiyo, Makungo, Mathivha and Nkuna 2019: 1). Maripe and Rankopo (2018: 11) found in a study in Botswana, that the lack of knowledge with regards to climate change, hazards and risks had increased the vulnerability of communities to the devastating effects of natural disasters such as floods. They found that 63% of their sample were unprepared for the floods (Maripe and Rankopo 2018: 7). Likewise, a 2020 study by Mathew, Louis and Mabila (2021b: 2), on the strategies implemented after a flooding disaster, by the Government of Zimbabwe to mitigate the effects of floods, found that a large proportion of participants had not received any forewarning regarding the impending flood disaster in 2019.

1.5.6 The role of humanitarian organizations

In addition to government efforts, a wide range of humanitarian organizations such as the Red Cross were found to provide crucial assistance, in the wake of floods. They provided food, blankets, clothes and mattresses amongst other necessary items to needy individuals and families (Mudefi 2023: 16). Faith-based organizations were central to the disaster response in KwaZulu-Natal providing both humanitarian and religious aid to those affected (Metelerkamp 2022: para. 2 line 2; Nzwili 2022: para. 11 line 1). Faith-based organizations are often well-positioned to provide grassroots assistance in times of disaster, due to their deep roots within communities (Rivera and Nickels 2014: 181; Ferris 2005: 311). One of the primary roles of faith-based organizations, is to distribute relief, on the basis of humanitarian considerations. Their help is premised on the principles of humanity, impartiality, neutrality, independence and empowerment (International Committee of the Red Cross (ICRC) 2002: 2). In the case of the 2022 floods, churches and religious institutions served as critical sites for relief distribution, offering both material and psychological support to flood survivors (Metelerkamp 2022: para. 2 line 2; Nzwili 2022: para. 11 line 1). An analysis of the role of faith-based organizations played during Hurricane Katrina, indicated that some of the services provided by faith-based organizations included rescue, reuniting family members, providing shelter, meeting cultural needs, donations management, clean-up and medical services (Phillips and Jenkins 2010: para. 1 line 11). In contrast, De Vita, Kramer, Eyser, Hall, Kehayova and Triplett (2008: ii) found that fewer faith-based organizations had provided recovery assistance such as the provision of housing and psychological counselling, in the long-term following a disaster. Instead, the help provided was for immediate relief in terms of basic necessities, such as meals, clothes and shelters (De Vita *et al.* 2008: ii).

The April 2022 floods in eThekweni was a tragic reminder of the region's vulnerability to extreme weather events. This was exacerbated by factors such as climate change, rapid urbanization, and inadequate infrastructure. This introduction highlighted the multifaceted nature of flood disasters, it placed natural disasters in its context, and explored its causes, physical and psychosocial effects. This created a foundation for understanding the broader impact of floods and the support mechanisms that could

build resilience in the face of such adversities. The problem statement is discussed in the sub-section that follows.

1.6 Problem statement

Prior to the April 2022 floods, eThekweni was already grappling with a multitude of socio-economic issues, which consequently intensified the impact of the disaster on families and communities (Jewkes *et al.* 2023: 1). In 2021, the Province of KwaZulu-Natal was struck by violent riots, with eThekweni, being hardest hit by looting and the destruction and closure of businesses. This looting and destruction of many essential businesses cumulatively impacted the local economy (Makoni 2021: 287). This in turn affected the livelihoods of many, further compounding the economic difficulties that many low-income households were facing. In addition, the COVID-19 pandemic introduced further devastating effects to an already fragile economy, thereby disrupting the mental health of many residents (Jewkes *et al.* 2023: 2). The pandemic led to the loss of jobs, constrained access to healthcare services, and spurred the separation of people from their families and communities. This shaped an unsteady and fractured family and community life, making it harder for those in eThekweni to endure further trauma and losses that was caused by the floods. The combination of social unrest, economic instability, and the residual effects of the pandemic meant that the capacity of the community to respond to and recover from the floods became incredibly strained, thereby exemplifying the importance of understanding the mental health sequelae of the floods and the need for a multifaceted approach to the problems that individuals and families were experiencing.

Despite the physical devastation wrought by these extreme weather occurrences, little research has been done with regards to the experiences of those affected and the effect the floods have had on families and communities. Furthermore, whilst faith-based organizations have been honoured for their role in providing disaster relief, internationally, little empirical research exists locally, which documents their contributions to provisioning humanitarian aid and spiritual support, within the context of flood recovery in South Africa.

This study aims to close this research gap by endeavouring to understand the complex and multidimensional effects of the floods, on individuals and families in communities that were hardest hit, during the disaster. The study will seek to understand how people encountered and experienced the disaster, its psycho-social and economic effects on their lives, the community support received and the role of social and spiritual networks that enabled them to navigate the losses and distress they endured during the floods.

The study looked at the impact of the flood. The researcher does not dispute the fact that prior socio-economic distress, hardships and living conditions did not also contribute to the distress of the participants. If anything it exacerbated hardships and this was noted in the analysis. This rich exploration of the issues emerging during the disaster, are crucial to informing disaster policies and recovery plans, all of which are essential to ensuring that the relevant stakeholders are better prepared during future disasters to help affected families and communities. The study was therefore relevant to understanding the complex needs of those affected so that appropriate health care, mental health and social and community support could be levelled to enable their recovery from the trauma of the disaster. The rationale for the study, is presented in the sub-section, that follows.

1.7 Rationale for the study

The floods that struck eThekweni in April 2022, which occurred shortly after the intense waves of the COVID-19 pandemic, warrants deeper exploration in terms of its impact on individuals and families (Ngcamu 2023: 2). This study was conceived to focus on the holistic physical and psychosocial effects that the floods had on individuals and families and its disruption to community life.

Whilst the number of floods that affect human societies has increased each year (United Nations 2020: 6), causing significant adverse physical, psychological and social effects, little empirical research has been done in South Africa with regards to same. It was important to investigate the local context, particularly because of the increased vulnerability of those living in marginalised and disadvantaged areas, such as informal settlements (Agonafir, Lakhankar, Khanbilvardi, Krakauer, Radell and

Devineni 2023: 1). Urbanization and the changing use of land has increased the risk of flooding disasters (Dube, Nhamo and Chikodzi 2021: 460). Settlements are often built on land that have poor access to basic services and are characterized by poor storm water drainage rendering them vulnerable to increased environmental hazards such as flooding (Dlamini *et al.* 2024: 1; Cinnamon and Noth 2023: 1).

This study will augment the work done in international studies, which have documented the physical and psychosocial impact of natural disasters (Bushong and Welch 2023: 7; Li *et al.* 2023: 2; Nöthling, Gibbs, Washington, Gigaba, Willan, Abrahams and Jewkes 2023: 210; Asim, Sathian, Van Teijlingen, Mekkodathil, Babu, Rajesh, Kumar, Simkhada and Banerjee 2022: 11; Golitaleb, Mazaheri, Bonyadi and Sahebi 2022: 6; Hanchey 2021: 1385; Lee, Perera, Glickman and Taing 2020: 6; Burton, Rabito, Danielson and Takaro 2016: 238). This study builds on that work by focusing on exploring the experiences of individuals in rural, urban, and informal settlements within a South African metropolitan area. It contributes to the literature on disaster planning (Chartoff, Kropp and Roman 2023: 1; Goniewicz, Sarker and Schoch-Spana 2023: 1; Zhang and Zhang 2023: 2).

Hence whilst there is a growing body of literature little exists in the South African context with regards to the psycho-social effects of natural disasters, and particularly with regards to eThekweni, the case being studied. Empirical research that focuses on the role of faith-based organizations, within the context of natural disasters in South Africa, is also limited. This empirical gap is particularly evident in the South African context, where disaster recovery studies have neglected the intersection of material and spiritual recovery.

In eThekweni, there are no known studies that have explored the multidimensional effects of the floods and the salience of community and social support systems in enabling the recovery of affected individuals and communities. The study will enable a deeper understanding of individual experiences, within the context of the floods, particularly its impact on their physical health and their mental health. Moreover, an exploration of the impact on family and on community infrastructural damages is crucial to informing implementing timeous and effective disaster support and

management to affected families and communities. More importantly it will help to understand the nature of mental health support services required to enable individuals and families transition effectively through the multitude of socio-economic and emotional issues, emerging post the floods. The study also sheds light on the issues particularly within eThekweni, as the city faces deeper vulnerabilities in the urban, rural and informal settlements (KwaZulu-Natal, Department of Cooperative Governance 2018: 15).

Studies undertaken thus far in eThekweni related to the April 2022 floods, have focussed on issues in a linear way, and through the lens of distinct disciplinary perspectives, with limited scope in terms of affected populations (Jewkes *et al.* (2023: 1) for example focussed on gender-based violence whilst Naidoo *et al.* (2022: 1) investigated the challenges experienced by health facilities during the flood. A study by Thoithi *et al.* (2022: 1) concentrated on meteorological data, whilst both Mudefi (2023: 1) addressed issues related to disaster management. Whilst these small-scale studies provided valuable insights, they focused on narrow issues related to the floods and were confined to smaller geographical spaces, instead of focussing on urban, rural and informal settlements. The current study extends over a wider and diverse geographical space, by exploring multidimensional and holistic issues in relation to families and communities at the interface of the floods. Moreover, it probes the level of social and humanitarian support during such a crisis.

Hence the salience of the study to provide a critical and localized approach that can augment the global disaster recovery discussion. Through interviews with affected people, difficulties related to life in a shelter, medical requirements, financial support, as well as the mental health and spiritual needs of affected people will be better understood. By focusing on a metropolitan area, that has become particularly vulnerable to climate related events, this study will fill a critical gap in the literature and provide a context specific understanding of how the floods in KwaZulu-Natal caused widespread devastation, both physical, emotional and material.

The study also explores the critical role played by faith-based organizations in provisioning humanitarian and spiritual support. This is an underexplored area in the

literature (Elliot and Webb 2023: 37; Hirono and Blake 2017: 1; Chida and Chabata 2016: 38; Baidhawya 2015: 184), further supporting the value of the study. By inquiring how diverse faith-based organizations, rallied to support affected communities, richer insights into their roles during disaster relief efforts can be acquired. This humanitarian aid is crucial to supporting formal relief operations of the municipality and hence an understanding of their potential contribution is important, in terms of their inclusion within future disaster related efforts. In the sub-sections, that follow, the aim and objectives of the study will be presented, by a discussion of the theoretical framework that underpins the study.

1.8 Aim and objectives

1.8.1 Aim:

The aim of this study was to understand how individuals, their families and communities in the eThekweni District, experienced the 2022 KwaZulu-Natal floods and the effect it had on the psycho-social well-being of individuals and families.

1.8.2 Objectives:

To understand how individuals and their families experienced the April 2022 KwaZulu-Natal floods.

1. To inquire about how their physical circumstances were affected by the floods.
2. To explore the health, psychological and social effects of the floods on individuals and on their family life.
3. To understand how communities were affected during the floods.
4. To inquire how faith-based organizations supported families and communities during this natural disaster.
5. To make recommendations on how families and communities may be assisted at both the family and community level post the floods.

1.8.3 Research questions

1. How did individuals and their families experienced the April 2022 KwaZulu-Natal floods.
2. What disruption did individuals and families have to their physical circumstances?
3. What are the physical, psychological and social effects of the floods on individuals and on their family life?
4. How were communities affected during the floods?
5. How did faith-based organizations support families and communities during this natural disaster?
6. What recommendations can be made to assist families and communities post the floods?

1.9 Theoretical framework

A theoretical framework serves as the cornerstone, upon which a study is built and provides a lens through which the researcher constructs his research study (Adom, Hussein and Agyem 2018: 438). Kivunja (2018: 46) added that the theoretical framework is a structure that uses existing theories, concepts, and models to inform and shape the research questions and interpret the findings. The choice of a framework requires the researcher to understand fully the problem, purpose, and significance of the study (Adom *et al.* 2018: 439). The physical, mental, social, and spiritual aspects of an individual's life are deeply interconnected and play a crucial role in shaping their overall well-being (Božek, Nowak and Blukacz 2020: 7). For this study, the researcher identified the biopsychosocial model as the theoretical framework to guide the study, as it enables a holistic understanding of how the biological, psychological, and social factors of a person's life can reciprocally interact with and influence their health and well-being.

George Engel established the biopsychosocial model in the 1970s, as an alternate to the biomedical model which considered the physical aspects of health only. In contrast, the biopsychosocial model viewed health and well-being as intimately interconnected with the physical, psychological, and social factors (Bolton 2023: 7509). This holistic

model acknowledges that the physical wellness of a person is influenced not only by their behaviours, beliefs, feelings and experiences (McInerney 2002: 1537), but also by social elements such as socio-economic status and support systems and cultural norms (Bolton 2023: 7506). Lehman, David and Gruber (2017: 2) stated that these factors are not static but fluid and can influence each other in a dynamic and reciprocal way. There are three components that undergird the model, namely the biological, psychological and social components.

- Biological component: these factors involve the physical and physiological aspects of health, such as genetics, anatomy, biochemistry, immune function, and the presence of disease. Biological factors are the conventional "medical" components, that have been the focus of much of traditional medicine (Lehman *et al.* 2017: 2; Wade and Halligan 2017: 998).
- Psychological component: this refers to the individual's thoughts, emotions, behaviours, and mental health. Psychological factors include stress, coping mechanisms, personality, mood disorders, cognitive function, and how a person perceives and responds to illness (Lehman *et al.* 2017: 3; Wade and Halligan 2017: 998).
- Social component: Social factors encompass the broader context of the individual's life, such as relationships, social support networks, socioeconomic status, cultural influences, and environmental stressors. Social influences can affect a person's overall well-being and how they cope with life stressors (Wade and Halligan 2017: 998).

Natural disasters affect populations globally and often cause physical injuries, loss of life, damage to property and community life. It also impacts the mental health of individuals (Leppold, Gibbs, Block, Reifels and Quinn 2022: e277). Despite the diversity of its impact, most people receive help related to their biological (physical injuries) and other physical needs such as food relief items. Their mental health and spiritual needs are often neglected and the overall impact on the family ignored (Thompson-Assan, Ayebea Agudze and Kakraba Kaitoo 2023: 2).

Within the context of a natural disaster such as a flood, the biopsychosocial model provides a holistic approach to understanding the multidimensional and interconnected effects of the physical, social and psychological components. The biopsychosocial model reflects that physical injuries and loss of physical needs such as the safety of one's home and personal belongings and good, can cause substantial mental health sequelae and trauma. Many individuals can experience mental health effects, and begin to present with anxiety, depression and post-traumatic stress disorder depending on their circumstances (Koopman, Classen, Cardena and Spiegel 1995 cited in Ajibade, Armah, Kuuire, Luginaah, McBean and Tenkorang 2014: 4). These circumstances may be linked to biological, environmental, social, behavioural and psychological aspects (Ajibade *et al.* 2014: 4).

Physically, flooding disasters can lead to immediate physical injuries or diseases whilst also disrupting healthcare systems, which can offer immediate medical care to those whose health has been affected (Habibisaravi, Assadi, Gholami, Hasani, Pourmand, Navaie and Ghasemihamedani 2022: 1; Lee *et al.* 2020: 6; Burton *et al.* 2016: 238; Bich, Quang, Thanh Ha, Duc Hanh and Guha-Sapir 2011: 6). Psychological factors include trauma, stress, anxiety, and post-traumatic stress disorder, that often follows a disaster, thereby significantly affecting victims' mental health. These psychological responses can vary based on individual resilience, coping strategies, and previous mental health conditions (Zenker, Bubeck and Thieken 2024: 7; Golitaleb *et al.* 2022: 6). Socially, the model highlights how community structures, social support systems, and socioeconomic status influence post-disaster recovery. Disasters often exacerbate inequalities, within vulnerable populations who inevitably will experience huger challenges. The biopsychosocial model provides a wider lens to understand how these multifaceted factors interact to shape recovery outcomes (Dlamini *et al.* 2024: 10; Anwana and Owojori 2023: 1; Aksha, Juran, Resler and Zhang 2018: 103), making it a valuable framework to understand the study. This will enable the consideration of multidimensional strategies across medical, psychological, and community-based settings to assist affected individuals and families.

Whilst the biopsychosocial model has focussed on understanding health through the interaction of the three components, recently some researchers have begun

considering the spiritual component, within this holistic framework (Saad, De Medeiros and Mosini 2017: 1). Studies by Katerndahl (2008: 412), and Sulmasy (2002: 24) have underscored the importance of spirituality as part of a holistic approach to health and wellness. Recently, in 2023, the World Health Organization called for a revision of the definition of health to include spiritual well-being (Wüthrich-Grossenbacher 2024: 1). Spirituality can significantly influence an individual's coping mechanisms, emotional resilience, and sense of meaning during adversity, making it important to consider within the realm of natural disasters. It can also support mental health, as spiritually based practices like meditation or prayer can nurture psychological well-being (Manning, Ferris, Narvaez Rosario, Prues and Bouchard 2018: 12-13). By integrating spirituality within the biopsychosocial model, acknowledges its indivisibility from the physical, psychological and social components, thereby acknowledging that support and recovery interventions and strategies, must include a person's spiritual beliefs, practices, and sense of connection to something greater than themselves. Moreover, the role of religious and spiritual networks must be included to ensure the well-being of affected families and communities.

1.10 Research methodology

This study adopted a qualitative case study approach to exploring the physical and psychosocial effects of the April 2022 floods on individuals, families and communities. Semi-structured interviews were used to collect data from flood victims and faith-based leaders, to understand the impact of the flood on those in three different areas. Participants were recruited from an urban, semi-rural, and informal township. Members of three different faith-based organizations who assisted during and after the flooding event were also recruited.

Non-probability purposive sampling strategies were used to select participants who were affected by the 2022 floods in eThekweni and could provide valuable insights into how the disaster had impacted their life. The data analysis will be guided by using thematic analysis.

1.11 Structure of dissertation

Chapter 1 Background of study

Chapter one introduced the study and placed natural disasters within the context of the broader study. The chapter focussed on the background and rationale for the study. The research aim, objectives and research questions guiding the study are presented. The chapter concludes with a discussion of the theoretical framework that guides the study.

Chapter 2 Literature review

Chapter two contains a review of pertinent literature around the objectives of the study. It focuses on the impact of natural disasters and the effects of flooding in particular on people and communities.

Chapter 3 Research methodology

Chapter three focuses on the study design and provides a detailed description of the case study approach. This chapter also focuses on the data collection process, the data collection tools used in the study, sampling strategy and the two samples recruited for the study. It also details the data analysis process and strategies used to ensure trustworthiness of the research. The chapter concludes with an outline of the ethical considerations within the study.

Chapter 4 Analysis and discussion of findings

Chapter four presents the data and analysis, the interpretation and discussion of the findings made in the study.

Chapter 5 Conclusion and recommendations

The conclusion and recommendations that emerged from the data analysis and literature reviewed, are summarized in this chapter. The limitations are discussed. This chapter also provides guidelines for future studies in the field of disaster management.

1.12 Conclusion

This chapter provided an overview of the study on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal. It provided the background to the study, its aim and the rationale for the study. The chapter that follows presents the literature reviewed, related to the objectives of the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

A literature review is a systematic method of identification and evaluation of recorded research work written by researchers, students and disciplinary experts (Fink 2019: 6). According to Leite, Padilha and Cecatti (2019: 1) a literature review identifies the knowledge in a field, that is already known and clarifies the consequences of the problem being studied and identifies gaps in the current literature. It includes the process of identifying already published and written work regarding the research objectives (Chigbu, Atiku and Du Plessis 2023: 2). Snyder (2019: 333) asserted that a literature review is a systematic way of collecting and synthesizing the existing body of literature. Fink (2019: 16) further stated that research literature reviews can be contrasted with more subjective examinations of recorded information, allowing others to reproduce the methods utilised and to determine objectively whether to accept the results of the review. The aim of a literature review in a qualitative study, is to place the findings in the context of what is known about the topic (Luft, Jeong, Idsardi and Gardner 2022: 1). This chapter discusses the literature reviewed on the physical, psychological and social effects of natural disasters and flooding on individuals, families and communities as well as the role of faith-based organisations during these disasters.

In the current study, the researcher commenced the literature review before data collection to gain an understanding of the topic under study and to acquire insights into the meaning of the topic (Luft *et al.* 2022: 3; Ramalho, Adams, Huggard and Hoare 2015: 1), thus allowing the researcher to be aware of the effects caused by natural disasters such as flooding within the context of urban, rural and semi-rural settings.

The literature review begins with an overview of how the researcher sourced the literature and discusses the existing literature in the global and local context. The chapter then goes on to explore the literature linked to the research topic and the related research objectives.

2.2 Sourcing the literature

Leite *et al.* (2019: 5) argued that the researcher commences the gathering of information from the literature, by first defining the databases that will be searched and then actively searching the databases. Snyder (2019: 336) added that the use of search terms or words and phrases directly related to the research questions, improves access to the appropriate literature.

The databases sourced for this study included electronic databases that contained journals, dissertation repositories, books and reports. Research engines included Google and Google scholar, Summons (the library at Durban University of Technology), Pubmed, Sage Journals, Wiley online Library Journal, Taylor and Francis online Journal, EBSCOhost, Springer Link, and JSTOR Journals. To streamline the search and acquire the relevant literature, keywords and phrases were used in various combinations. This included namely, natural disasters, effects/impacts of floods and flooding, 2022 floods in KwaZulu-Natal, physical effects, psychosocial effects, mental health, faith-based organisations and natural disasters and humanitarian aid. The researcher also searched for citations, to find more recent articles that have been cited in other publications by other authors (Chigbu *et al.* 2023: 9). The electronic search engines were used to refine the search for relevant literature using the filtering option.

2.3 Natural disasters in its context

Natural disasters or natural hazards are naturally occurring events such as earthquakes, cyclones, floods, storms, mudslides, volcanic activity and wildfires (Chaudhary and Piracha 2021: 1101), which cause significant casualties, damages to property, loss of property and impact society and the economy (Cui, Peng, Shi, Tang, Ouyang, Zou, Liu, Li and Lei 2021: 216). Prasad and Francescutti (2017: 215) argued that natural disasters occur when a highly vulnerable community is overtaken by a danger, which causes death and morbidity. The World Health Organisation described natural disasters as calamitous incidents with atmospheric, geologic, and hydrologic origins that surpass the ability of a community to cope with that event (World Health

Organisation 2006: 5). Over the past two decades, more than 7000 disasters have been recorded worldwide. These events have resulted in 1.23 million deaths, averaging 60 000 fatalities per year and impacting four billion people.

Furthermore, disasters have caused global economic losses of about US\$ 2.97 trillion. The frequency and incidence of natural disasters have increased in comparison to the past two decades. Approximately 4000 disasters have been linked to natural hazards worldwide (United Nations 2020: 6). In addition to improved reporting and more extreme weather, the increase in natural disasters have been driven by climate change (United Nations 2021: 1). Additionally, due to the economic advantage of living in specific locations, more people inhabit potential disaster prone areas.

This is further impacted as the population of the world increases (Alexander 2018a: 10). Natural disasters do not occur evenly across the globe. Asia has suffered from the largest number of disaster events and deaths, followed by North America and Africa (Mokhtari, Faridi, Masoodi and Ahmadi 2023: 1). In a global context floods have been the most common disaster event over the past two decades, consisting 44% of the total occurrences. This is reflected in Figure 2.1 below. However, the severity of the disasters depends not only on the hazard itself but also the vulnerability and adaptability of the affected populations (Chaudhary and Piracha 2021: 1103). As indicated by Zorn (2018: 59), although natural disasters occur in both developed and developing countries, developing countries are more susceptible to the effects of natural disasters, due to their developing economies, socio-economic conditions and poor governance.

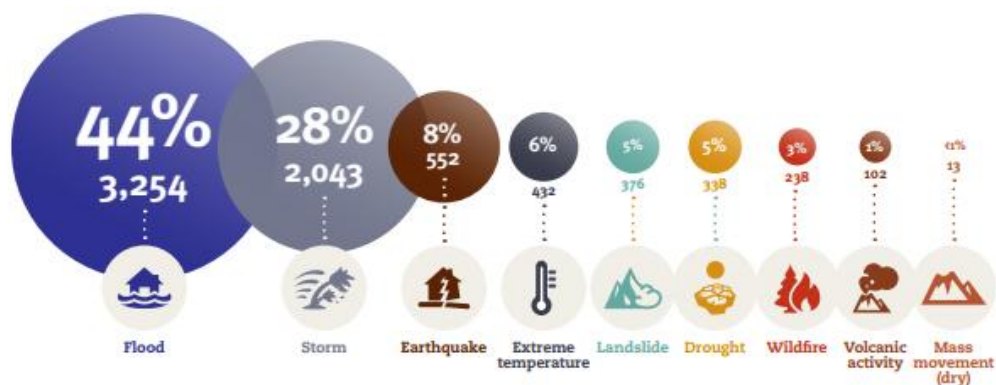


Figure 2.1: Global distribution of disaster type (2000-2019)

(Source: United Nations 2020: 10)

Disasters can occur quickly with little warning or have a slower onset but can cause severe physical and social effects (Chaudhary and Piracha 2021: 1101). In addition, disasters can result in community level traumatic reactions, which can have many physical and psychological effects on an individual's life, in terms of how they function daily (Zhang and Zhang 2023: 2; Amiri and Jahanitabesh 2022: 1; Makwana 2019: 3090).

It is important to understand the vulnerability of populations to natural disasters. Although these hazards are natural in origin, the impact on humankind is determined largely by the social, financial and political conditions, that influence and shape the individual, family and community (Chaudhary and Piracha 2021: 1103). In the section that follows, the concept of vulnerability within the context of disasters is discussed.

2.4 The vulnerability of humankind to natural disasters

In understanding how people are affected by natural hazards it is important to understand the notion of vulnerability. The United Nations Office for Disaster Risk Reduction (2017b: 1) described vulnerability as “the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards”. Chaudhary and Piracha (2021: 1103) described vulnerability as the incapacity to resist danger and predisposition to physical injury, death and economic loss due to loss of infrastructure, jobs and belongings when there is a natural disaster. Some of the areas that contribute to vulnerability are age, gender disparities, disabilities and socio-economic level. These are discussed below.

2.4.1 Age

Several studies have recognized that older people are more vulnerable or at greater risk and are more likely to suffer from higher rates of injuries, during natural disasters as opposed to other population groups. The mortality rates are also enhanced for this group (Engelman, Guzzardo, Antolin Muñiz, Arenas and Gomez 2022: 2156; Whitton 2018: 16; Zhu and Sun 2018: 137).

This heightened vulnerability amongst older adults is shaped by several factors, such as their health, mental health, social and economic circumstances which is compounded by their age (Langmann 2023: 133). As people age, their hearing and eyesight, cognitive, physical and mental resilience tends to deteriorate (Maltz 2019: 157). Hence the elderly population often requires additional support during disaster events (Whitton 2018: 16). Poor socioeconomic status further aggravates these conditions, including limited income, inadequate housing, and restricted access to healthcare or social support services (Alam, Sultana and Haque 2022: 5).

Despite these vulnerabilities, it is imperative to understand the different characteristics among older adults. In a qualitative study of elderly population in Iran, Daddoust, Khankeh, Ebadi, Sahaf, Nakhaei and Asgary (2018: 54) found that that individual capacities were among the most significant determinants of older people's vulnerability. The participants in their study stated that individual attributes including their experience, health, and sound financial condition had empowered them to handle the challenges that arose from a natural disaster.

Psychosocial dynamics also contribute significantly to the vulnerability of older populations. Hay and Pascoe (2022: 5) found that post-disaster older residents were more reluctant to request help, having enduring stoic attitudes and a sense of self-reliance, that hindered them from obtaining available support. However, these stereotypes of the elderly result in older populations being overlooked in disaster planning and response management (Phraknoi, Sutanto, Hu, Goh and Lee 2023:2). Historical disaster data also demonstrates the heightened vulnerability of older adults. Following Hurricane Katrina, McCann (2011: 1) reported that that of the 1330 people known to have perished along the Gulf Coast because of Hurricane Katrina, in Louisiana, 71% were over 60 years of age and 47% were above 75 years of age.

It is also important to recognize the intersectionality of age with other factors. Other researchers have identified vulnerable groups that are more at risk during natural disasters. Thompson, Trigg and Smith (2017: 1) identified older adults, families with young children, physically fragile people, and people with disabilities and mental health issues as being more vulnerable during a disaster. Similarly, Howard, Agllias, Bevis

and Blakemore (2018: 392) described low-income households, and culturally and linguistically diverse people as vulnerable populations.

A review conducted by Matlakala, Rantho and Mapaling (2024: 5) on the vulnerability of elderly people in Sub-Saharan Africa during extreme weather events, found that elderly people in the region faced weakened physical health, that often led to death. A study by Aldrich and Sawada (2015: 66) further found that physical strength during times of a disaster influenced survival. This was seen with the Indian Ocean tsunami where most elderly could not run fast enough to escape the flood surge. Matlakala *et al.* (2024: 5) also discovered that the elderly experienced adverse psychological effects following disasters due to stress and trauma. The loss of homes, jobs, loved ones and community, had a negative effect on the mental well-being of elderly due to existing age-related cognitive decline. These studies collectively advocate for the needs of the elderly populations to be considered in disaster management and preparedness in terms of response efforts. The elderly also face several financial insecurities, which further challenges their resilience and recovery from disaster events. Research by Mavhura (2019: 81) revealed that the elderly are often dependent on government grants and due to their limited income are unable to rebuild homes.

As with the elderly, children are also amongst those vulnerable to flood hazards. Over one billion children aged between one and fourteen years of age lived in areas with a high risk to natural disasters and in 2016, twenty-nine million children were adversely affected by disasters (Sadeghloo and Mikhak 2022: 1). Lara-Valencia, García-Pérez and Zuniga-Teran (2024: 847) added that children are dependent on social systems like families and schools, with daily routines such as transport to and from schools, increasing their risk to adverse effects from floods. Kousky (2016: 78) found in their study that children contracted more diseases than adults, post a flood. In addition, natural disasters affect children's psychological well-being more. A study conducted by Meltzer, Merdjanoff, Xu, Gershon, Emrich and Abramson (2023: 9) explored the relationship between exposure to Hurricane Katrina and psychological distress amongst children over 10 years.

In urban areas and cities, children often play outside and are therefore more exposed to rapidly moving water, electricity lines, debris and chemicals accumulated within flood waters (Centre for Disease Control 2023 cited in Lara-Valencia *et al.* 2024: 847) thus increasing their vulnerability. Kaźmierczak and Cavan (2011: 191) documented the increased vulnerability of children in their study on the risks in urban communities during flooding.

2.4.2 Gender disparities

A global study, conducted by Neumayer and Plumper (2008: 551) that analysed data from 141 countries. The study found that the more severe the disaster, the more substantial the impact on the lifespan of a female. In addition, women with a better socio-economic status were found to have a better life expectancy outcome from disasters. Hence the study concluded that the higher mortality rates amongst women during disasters were linked to gender based vulnerability. This vulnerability was embedded in their socioeconomic structures, which placed them at higher risk compared to men (Neumayer and Plümper 2008: 551). A World Bank publication (World Bank 2024: 27) also released a report that found a correlation between the impact of disasters and gender inequality. The report further recommended that policy makers bear the responsibility of utilizing available tools to mitigate disaster impacts and close gender gaps in outcomes, when disasters affect women and men differently. In addition, a greater understanding of the gender related factors shaping disaster risk will enable better policy and disaster program design. Alston, Hargreaves and Hazeleger (2018:407) argued that post-disaster assistance by workers must address gender-based disparities, as the way individuals prepare for and respond to a disaster is also shaped by gender dimensions. Thurston, Stöckl and Ranganathan (2021: 4) who conducted a systematic review of quantitative and qualitative studies found that there was an increase in violence against women during and after disasters.

In contrast, Fan and Huang (2023: 9) who conducted a longitudinal study of selected flooding events in Japan across four decades. The study noted that unlike in the 1980's when females were more susceptible and vulnerable to flood disasters and where their fatality was increased with age as compared to men, their vulnerability in contemporary

times was driven by age and not gender. Socio-economic conditions in South Africa, therefore dictates that a large proportion of the population, namely Black women reside in flood prone informal settlements, that are more likely to experience vulnerability due to natural climatic disasters (Udo and Naidu 2023: 3). Udo and Naidu (2023: 2) assessed local governments response to Black women's vulnerability and adaptability in eThekweni, South Africa. Their study found that there needs to be an intentional approach by authorities, to address the vulnerability of Black women to natural disasters. This included capacitating them with knowledge on flood management skills, governance structures within the disaster management departments and early warning systems.

2.4.3 Disabilities

People with disabilities are particularly vulnerable to natural hazards. Studies have shown that this group is at heightened risk, owing to the effects of their impairments, namely their sensory, motor and cognitive-linguistic limitations, as well as activity restrictions, such as mobility and communication limitations (Bongo, Lunga, Van Niekerk and Musarurwa 2019: 4; Gartrell, Calgaro, Goddard and Saorath 2020: 1). These limitations not only affect timely evacuation but also impede access to emergency information and services during a disaster.

Quaill, Barker and West (2019: 58) in a review of literature reported that those with physical disabilities, who had experienced a natural disaster were less likely to evacuate quickly from their homes. Moreover, there were concerns that flood shelters could accommodate their needs. The study also found that disabled people experienced lower self-esteem, greater anxiety and emotional trauma due to their decreased personal safety, thereby compounding the overall psychological effects of disasters.

The fatal consequences linked to physical vulnerabilities were documented by Fan and Huang (2023: 7). They found that during the 2020 Kuma River flooding disaster in Japan, fourteen geriatrics residing in a nursing home, passed on when the flood waters entered their facility. This was because of the limited number of staff who could not

move patients, who required wheelchairs, up to the second floor timeously. The study found that a decline in physical strength and function were risk factors for increased vulnerability to disasters.

Moreover, their exclusion from disaster planning processes has remained a persistent issue. Bongo *et al.* (2019: 1) conducted a study related to disability and disaster risk reduction as an incongruent matrix. The study was grounded in experiences from disaster risk reduction projects in southern Zimbabwe, between 2006 and 2014. One of the key findings was that people with disabilities, were not incorporated in the construction of disaster risk reduction processes and that policy documents did not specify how people with disabilities should be managed when a flood occurred (Bongo *et al.* 2019: 4).

The marginalisation of people with disabilities during flooding events reflects a broader trend of exclusion and systemic neglect. These vulnerabilities are compounded by socio-economic factors and hence it is important to understand these factors.

2.4.4 Socio-economic aspects

Socio-economic status plays an important role in shaping an individual and community's vulnerability to natural disasters including floods. Many studies show that socioeconomic status and the living environments of people residing in areas with higher risk, affects their vulnerability to the effect of natural disasters (Nor Diana, Muhamad, Taha, Osman and Alam 2021: 315; Davino, Gherghi, Sorana and Vistocco 2021: 1179; Kuran, Morsut, Kruke, Krüger, Segnestam, Orru, Nævestad, Airola, Keränen and Gabel 2020: 50). Okuda and Kawasaki (2022: 5) conducted a study on how disaster risk reduction influenced socio-economic development and the alleviation of poverty in Myanmar, during the COVID-19 pandemic. The study found that factors including education, income level and access to urban infrastructure increased socio-economic vulnerability.

Educational levels are also highlighted as a key determinant of disaster vulnerability. Nor Diana *et al.* (2021: 12) in a systematic review of social vulnerability in relation to

the hazards of landslide hazards in Malaysia, identified literacy as a critical risk factor. Communities with limited educational opportunities were more vulnerable to adverse effects of disasters. The study also showed that higher educational levels in the community were associated with greater disaster preparedness and resilience (Nor Diana *et al.* 2021: 12).

Globally, economic inequality is increasing, and this has been shown to be a critical driver of vulnerability in terms of natural disasters. A study by Lindersson, Raffetti, Rusca, Brandimarte, Mård and Di Baldassarre (2023: 995) assessed the income disparity and flood disasters across 67 middle- and high-income countries. They found that countries with income inequality, had a greater flood mortality rate. High levels of income inequality indicated that a larger amount of the population lived in poverty and lacked the resources required to prepare and evacuate during a flood disaster. In addition, poorer communities often lack adequate housing, healthcare, and access to clean water, which magnified the impact of natural disasters (Williams, Máñez Costa, Sutherland, Celliers and Scheffran 2019: 157).

Socio-economic vulnerability is also gendered. Studies within and outside Africa have also shown that due to the social dynamics and gender inequity, women and in particular poor women from rural communities, were more vulnerable within the context of natural disasters (Ejem and Ben-Enukora 2025: 10; Mendis, Thayaparan, Kaluarachchi and Pathirage 2023: 6; Alston *et al.* 2018: 407). Hansa and Venkatachalapathi (2017: 1) explored these socio-cultural constraints by conducting a qualitative review on disaster vulnerability amongst women in India. Their findings revealed that low socio-economic status increases the vulnerability of women. For example, in India, due to culture many women do not have education and financial independence and are restricted to their domestic territory (Hansa and Venkatachalapathi 2017: 3). The study also found that post disasters, during relocation many women were more vulnerable to sexual attacks and trafficking (Hansa and Venkatachalapathi 2017: 3).

In the South African context, similar trends have been documented. Communities in informal settlements that are characterised by poor socio-economic status are

disproportionally affected during floods, due to unsuitable housing, inadequate drainage and sanitation structures and a lack of access to emergency services (Dlamini *et al.* 2024: 11; Anwana and Owojori 2023: 4; Williams *et al.* 2019: 157).

Socio-economic factors often manifest spatially with the urban poor being pushed away and forced to set up homes in areas that are geographically and structurally at risk of disasters. As such it is critical to understand the nature of informal settlements and their vulnerability to natural disasters.

2.4.5 Informal settlements

Informal settlements also known as squatter camps and slums are defined as areas that are unplanned and with no legal tenure and public infrastructure, in which improvised human settlements are built. Informal settlements have become a significant aspect of the urban economic landscape in developing countries (Sekhani, Mohan, Mistry, Singh and Mittal 2022: 1). The combination of increased population growth, inadvertent urbanization and climate change, has led to an increase in the vulnerability of the poor living in urban areas to natural hazards. The United Nations 2022 Report on Sustainable Development Goals (United Nations 2022: 48) detailed that almost 25% of people who lived in urban areas, lived in slums or informal settlements with the largest percentage of informal settlement dwellers residing in sub-Saharan Africa. These areas are vulnerable to natural disasters such as flooding due to their unregulated development, poor infrastructure and hazardous geographical location.

A mixed method study that used both qualitative and quantitative methodologies was conducted in Tanzania, on flooding in informal settlements. One hundred and ninety-nine respondents living in informal settlements completed questionnaires. Qualitative data was also collected via interviews from key community leaders such as ward leaders, and representative of local institutions. The study found that informal settlements were more at risk in terms of the hazards of disasters such as flooding due to their location in low-lying areas, as the river allowed them access to water for daily use (John 2020: 68).

Similarly, Quesada-Román (2022: 5) conducted a disaster risk evaluation of all informal settlements in Costa Rica in South America. They utilised all available information to calculate the levels of risk for informal settlements. Many were found to be overcrowded and susceptible to landslides and floods. Results of their analysis revealed that the municipalities with the highest number of informal settlements, were also those with the greatest disaster risk, indicating a strong association between informal housing and vulnerability.

The lack of early warning systems further compounds risk in these vulnerable contexts. A study by Peters, Clark-Ginsberg, McCaul, Cáceres, Nuñez, Balagna, López, Patel, Patel and Van Den Hoek (2022: 5) on the development of early warning and response systems in informal settlements in Honduras, found that the lack of proper early warning systems further exacerbates the vulnerability of informal settlements. The study found that early warning systems could assist people and businesses in making decisions, that could protect them from the impact of disasters. These findings were echoed in a recent study in South Africa. Muhame, Ncube and Bahta (2024: 1566) investigated the dissemination of early warning information and participation in early warnings and disaster risk reduction in Khayelitsha informal settlement in Cape Town, South Africa. The study found that the heads of households interviewed, identified five ideal communication methods for an early warning system and disaster information sharing. These included through the church, schools and social media channels (WhatsApp, Facebook, Twitter, Instagram), community radio, and through the distributions of pamphlets and mounted posters (Muhame *et al.* 2024: 1566). These findings underscore the importance of using diverse, community specific media for effective communication on risk.

In South Africa there has been an increase in the urban population in the past decade. This together with the absence of inexpensive housing and land in urban areas results in the growth of informal settlements across urban cities (Dlamini *et al.* 2024: 2; Mthiyane, Wissink and Chiwawa 2022: 2; Parikh, Bisaga, Loggia, Georgiadou and Ojo-Aromokudu 2020: 4). In these cities, informal settlements are often located close to areas with high environmental risks due to the need for the population habituating the settlements to be close to their areas of employment. In addition, many informal

settlements that develop in areas that are unplanned, are structurally challenged and have limited social facilities and services (Williams *et al.* 2019: 157).

To understand the risk and vulnerability of informal settlements to natural disasters, Dlamini *et al.* (2024: 10) conducted a study on informal settlements in KwaZulu-Natal, South Africa. The mapped data reviewed indicated that the informal settlements were located on flood plains, near rivers and in areas with a high socio-economic risk. Similarly, Madubula and van Eeden (2024: 1) conducted an analysis in the mining township of Bekkersdal situated in Gauteng, South Africa, with regards to the vulnerability of informal and formal households to disaster risks. Their study found a deep vulnerability to mining related risks such as dust, windstorms and earth tremors which were high, because of the geographical location of the township. The study found that the township was a distance away from basic services and a magnitude of illegal electricity connections.

Rendering assistance to those living in informal settlements has several challenges. These areas, which are driven by local economic development and lack formal planning, are often characterized by poor living conditions, inadequate infrastructure, and extreme poverty.

2.5 The nature of loss after a natural disaster

Natural disasters result in more than the destruction of infrastructure and property. In the aftermath of natural disasters, people who lose their homes and belongings experience a profound sense of loss. Zapf (2010: 40) explored past and present neglect of the natural environment within mainstream social work. He described the concept of 'people as a place' in which the physical environment that people live in, not only serves as a place of habituation, but additionally as a place that has significance and emotional value. Hence, when this place is destroyed people suffer both physical impacts of the disaster, as well as the destruction of their sense of self.

A qualitative study involving government managers, non-governmental organizations, social workers and community members involved in the Australian 2009 bushfire

disaster, found that the participants had experienced tangible losses. This encompassed the absence of early warnings and thus limited preparation time, physical damage and the requirement to restore infrastructure and essential care services (Alston *et al.* 2018: 409). The intangible losses included the loss of lives, injured individuals, negative effects on health and loss of community and social networks (Alston *et al.* 2018: 409). For people affected, this equated to a loss of control over their life. The study further found that the loss of control over one's life was impacted by post disaster cleans ups, as victims were not allowed back to their damaged homes thereby preventing them from reflecting on what they had lost (Alston *et al.* 2018: 412). Participants who were from non-governmental organisations and community found that the loss of sense of belonging, place and being part of a community, was evident even five years post disaster, with participants suffering from fear and anxiety. Some of the long-term issues identified included destruction of relationships, increase in health issues, loss of dignity and loss of place due to fractured communities (Alston *et al.* 2018: 411).

The multidimensional nature of loss was also evident during flooding events. Song, Atun, Blanford and Anthonj (2025: 4) in a review of literature on the impact of flooding on the social and mental health of adults, found that many individuals experienced not just the trauma of displacement and property loss, but also a disruption of their daily lives and social relationships resulting in loss of autonomy and psychological distress such as anxiety and depression.

These findings underscore that the sense of loss extends beyond the destruction of the environment, infrastructure and personal belongings, but also encompasses a disruption of the fundamental elements that give our lives meaning. However, whilst the nature of loss after a natural disaster encompasses physical, emotional and social areas, the scale and intensity of loss are also shaped by how prepared people and communities are before a disaster event. Being prepared is not only a protective factor, but also a determinant of post disaster recovery and psychosocial well-being (Ajodhia and Makhanya (2024: 10; Grab and Nash 2023: 11). The section that follows delves closely into the area of preparedness.

2.6 Preparedness for natural disasters

Natural disasters such as earthquakes, hurricanes and storms requires people to be prepared for unexpected events (Krichen, Abdalzaher, Elwekeil and Fouda 2024: 99). Being prepared not only encompasses possession of essential survival supplies such as 'water, food, torches, first-aid kits, radios, suitable clothing, and footwear' but also furniture and property insurance (Sopha and Asih 2019: 6). Baker and Cormier (2015: 32) argued that preparedness also necessitates adequate personal, social and financial aspects. However, this is challenging for individuals facing economic hardships, limited social support systems and assistance to prepare for a disaster. These individuals, often referred to as 'vulnerable' in disaster management, includes people from previously disadvantaged communities and the underprivileged. Due to their lack of necessary resources, they face significant barriers to effective preparedness. The absence of adequate necessities such as food, adequate housing, transportation and medical care for daily requirements, limits their ability to set aside emergency supplies required for such preparedness (Baker and Cormier 2015: 32).

Blake, Marlowe and Johnston (2017: 283) described the unpreparedness of people who have no financial capacity or support when impacted by earthquakes in New Zealand. They argued that social advancements have led to the creation of risks, which can be attributed to the negative consequences of technological advancements and consumer capitalism. In addition, the rise of industrialized and urbanized societies, coupled with globalization and population growth, has resulted in the occurrence of disasters, when natural hazards intersect with modernity, causing harm to individuals and communities. An example of this is the risk of flooding, which arises when housing, industrial facilities and infrastructural buildings are constructed within flood prone areas. Other researchers have also found that poverty is directly related to preparedness and that reconstructing their lives after disasters strike, can be particularly challenging for individuals who are economically disadvantaged. Furthermore, these individuals frequently reside in regions with a high susceptibility to disasters, which increases their exposure to associated risks (Tasri, Karimi and Muslim 2022: 3; Hallegatte and Walsh 2021: 223; Blake *et al.* (2017: 284). In addition, their

housing conditions are often substandard and unable to withstand catastrophic events (Hallegatte and Walsh 2021: 225).

Other scholars have suggested that evacuation is hampered due to a lack of vehicles and transport (Salini, Saran, Sabitha and Sreeja 2021: 2; Blake *et al.* 2017: 284). Moreover, poverty impacts the availability of household insurance and savings. Blake *et al.* (2017: 284) went on to add that disadvantaged people are often unable to replace household items like bedding, carpets, clothing, television and toys without insurance and savings. Individuals with limited formal education or few job opportunities also face added challenges. Zakour and Gillespie 2013 (cited in Blake *et al.* 2017: 2) opined that having sufficient household and community wealth is important during disasters as without these resources, communities struggle to recover.

Several studies have found that during disaster planning, disadvantaged groups are often neglected by the government which results in undue suffering. Hurricane Katrina serves as an example, where the majority of the 1600 fatalities were individuals who were poor, African American, or elderly. These individuals perished due to various reasons such as floodwater, starvation, dehydration, and life in substandard emergency shelters with insufficient resources (Waddell, Jayaweera, Mirsaiedi, Beier and Kumar 2021: 1; Naser-Hall 2013: 55). Hallegatte and Walsh (2021: 223) in a literature review on why poor populations are affected more by natural disasters, found that there is a relationship between poverty and disaster losses. Individuals who live in poverty face greater vulnerability to the impact of natural disasters. Consequently, these disasters exacerbate poverty significantly. The study showed that in most countries which accounted for 73% of the population studied, people from low-income urban homes had experienced greater flood exposure than the average urban household. Furthermore, due to the asset vulnerability of poor people and communities, they incurred losses equivalent to 85% of their yearly income, when the cost of income, assets, and repairs were combined (Hallegatte and Walsh 2021: 231). Blake *et al.* (2017: 286) stated that to ensure inclusive preparedness of all population groups, it is important to research and understand the needs of disadvantaged people within the context of historical, geographical, social, political, and economic spaces.

2.7 Physical health effects of natural disasters

Natural disasters affect physical health during and immediately after a disaster as well as in the long term (Leppold *et al.* 2022: 4). These effects include injury, respiratory diseases, musculoskeletal affects, vector and water borne diseases (Li, Toll, Martino, Wiesel, Botha and Bentley 2023: 2; Leppold *et al.* 2022: 4; Zacher, Raker, Arcaya, Lowe, Rhodes and Waters 2021: 127; Karaye, Ross and Horney 2020: 602).

A study conducted by Lowe, McGrath, Young, Kwok, Engel, Galea and Sandler (2019: 200) on the impact of Hurricane Katrina and the Deepwater Horizon oil spill amongst a large sample of Gulf Coast residents in the USA. They found that people who were exposed to natural disasters had suffered various physical adverse effects such as respiratory issues (coughing, wheezing, tightness in the chest), cardiovascular problems (palpitations, difficulty breathing), musculoskeletal pain and gastrointestinal difficulties (diarrhoea, constipation).

Li *et al.* (2023: 9) examined the long term physical and mental health outcomes following natural disasters using a longitudinal dataset from 2009 to 2019, from Australia. They focused on individuals whose homes were damaged. In contrast, their study found that most individuals showed minimal health decline and recovered quickly. However, of the 20% of people who were severely affected, the study showed that they had poor physical health prior to the disaster which led to slower recovery. This indicated that pre-existing physical conditions increased the risk factors resulting in greater impact and slower recovery, by 51% in terms of physical health

Hahn, Van Wyck, Lessard and Fried (2022: 1) investigated how recent and repeated natural disasters affected acute and chronic health outcomes in 500 communities, across the USA. They used data from the Centre for Disease Control and Prevention. The study found that communities that experienced natural disasters had higher rates of asthma, hypertension, and general poor health. Additionally, these outcomes increased with each additional experience of a natural disaster, indicating a cumulative health burden linked to repeated exposure (Hahn *et al.* 2022: 7). However, not all studies indicated a cumulative effect of repeated exposure to disasters on physical

health. For instance, Grabich, Robinson, Engel, Konrad, Richardson and Horney (2016: 2474) examined maternal and child health, following the 2004 Hurricane Charley. They found that exposure to the hurricane either shortly before conception or during pregnancy, was associated with a higher risk of preterm delivery. However, any subsequent exposure to another hurricane did not increase this risk further.

A scoping review conducted by Kilungo, Chukwuonye, Okpanachi and Hussein (2024: 12) that explored the research on climate change and its impact on health in Sub-Saharan Africa. They found that drought, extreme heat and poor water quality, due to microbes and chemicals led to physical illnesses such as heat exhaustion and infectious diseases such as cholera and food insecurity and malnutrition.

Exposure to a natural disaster impact both the physical well-being and mental health of affected people. The section that explores the psychological effects of natural disasters.

2.8 Psychological effects of natural disasters

The reactions of individuals and communities to disasters can be described in different phases, as depicted in Figure 2.2. Math, Nirmala, Moirangthem and Kumar (2015: 263) referred to the phases as the “heroic phase, honeymoon phase, disillusionment phase and restoration phase”. In the heroic phase survivors in the community typically showed selfless behaviour, as they assisted with rescue, shelter, food and supporting their community. The honeymoon phase is when the relief agencies assist, survivors are transferred to safer shelters, there is greater media attention with regards to the survivors, free medical aid, food, water and shelter, as well as rehabilitation promises, that provides considerable reassurance and hope to survivors that their community will be rebuilt in the future. There are also promises that their losses will be accounted for through the provisioning of monetary benefits. The disillusionment phase is when there is a cessation of relief material provided, resources and visits by the politicians, media and non-governmental organisations. The intricate process of reconstructing and recuperating seems unattainable to the survivors, due to obstacles in the form of

bureaucratic procedures, prejudice, unfair treatment and corruption. It is during this phase that effects on mental health can become more severe (Math *et al.* 2015: 263).

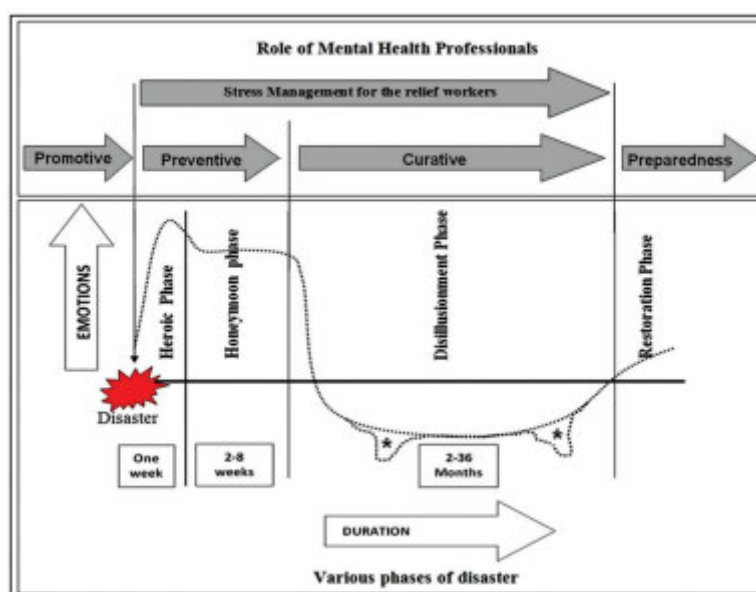


Figure 2.2: Biopsychosocial response pattern and temporal phases of disaster
(Source: Math *et al.* 2015: 263)

As the world's population increases and our resources decrease, natural disasters have clear psychosocial effects on humans, including post-traumatic stress disorder, anxiety and suicide (Amiri and Jahanitabesh 2022: 1). Vulnerable groups, including women, individuals of lower socioeconomic status, older people, and those with pre-existing mental health conditions, are particularly at risk (Saeed and Gargano 2022: 16). The World Health Organisation reported results from over 200 studies that were conducted in English, Chinese, and Japanese (Newnham, Mergelsberg, Chen, Kim, Gibbs, Dzidic, DaSilva, Chan, Shimomura and Narita 2022: 1). They found that depressive and anxiety levels, remained elevated for years post a disaster, with children and adolescents experiencing notably higher levels (Newnham *et al.* 2022: 11). The study concluded that approximately 24% of individuals impacted by disasters will acquire clinically significant post-traumatic stress disorder within six months of the event, 28% will acquire depressive symptoms, and 23% will acquire anxiety (Newnham *et al.* 2022: 7).

In the period that follows a disaster, many people begin to show symptoms of emotional distress, that can adversely affect their cognitive performance and if not

treated can lead to chronic mental illness (Amiri and Jahanitabesh 2022: 1). The American Psychiatric Association (2023: 1) described some of the early symptoms following a disaster as anxiety as survivors are filled with fear and uncertainty of the future, insomnia, grief, sadness, numbness, headaches and misuse of alcohol.

Grief is a reaction that arises from various types of loss such as death, unexpected life events and changes and leaves a person traumatized, especially if it results from disasters such as earthquakes, tsunamis, flooding and wars (Pop-Jordanova 2021: 1). A study conducted by Ergün and Şenyüz (2022: 1364) on prolonged grief disorder among survivors bereaved by the 2011 Van Earthquake in Turkey, showed that of the 495 individuals who had suffered losses due to the earthquake, 8.9% met the conditions of probable prolonged grief disorder. Predictors of prolonged grief disorder included a woman, being 40 years or over, people who had suffered from physical injury, damage to property, loss of family members, and the psychological effects of the earthquake.

Another study conducted in 2019 on survivors of the 2010 Haiti earthquake, on whether troubled sleep was related to mental health problems following the disaster, found that 94% of survivors reported experiencing symptoms of insomnia. The study found that two years after the disaster, 42% of the sample were presenting with substantial levels of post-traumatic stress disorder, and 22% had symptoms of depression (Blanc, Eugene, Louis, Cadichon, Joseph, Pierre, Laine, Alexandre and Huang 2020: A356).

Kino, Aida, Kondo and Kawachi (2021: 452) conducted a five year follow up study to track the progression of depressive and post-traumatic stress symptoms amongst the survivors of the 2011 Great East Japan earthquake and tsunami. They found that amongst those without pre-existing depressive symptoms, 13.6% had developed depressive symptoms two and half years following the disaster whilst 11.1% of survivors, still experienced post-traumatic stress symptoms after two years. The study also indicated that there was a link between job loss and consistent post-traumatic stress disorder (Kino *et al.* 2021: 456). Valladares-Garrido, Zapata-Castro, Domínguez-Troncos, García-Vicente, León-Figueroa, Zila-Velasque, Grados-

Espinoza, Astudillo-Rueda, Peralta and Díaz-Vélez (2022: 1) conducted a cross-sectional study that aimed to discover the factors related to depressive and anxiety symptoms amongst people who experienced the 2021 earthquake in Peru. The study found that of the 177 participants, 52% experienced depression and 52% suffered with anxiety related symptoms (Valladares-Garrido *et al.* 2022: 4). The presence of depressive symptoms was highest amongst people who experienced damage to housing and food insecurity, whilst the presence of anxiety was associated more frequently with people who had suffered from physical injury, food insecurity and insomnia (Valladares-Garrido *et al.* 2022: 10). This is similar to another study conducted in Japan, which showed the association between loss of housing and post-traumatic stress disorder, depression and insomnia (Shiba, Hikichi, Okuzono, van der Weele, Arcaya, Daoud, Cowden, Yazawa, Zhu and Aida 2022: 130).

A study by Guo, Liu, Kong, Solomon and Fu (2018: 90) with regards to the relationship between post-traumatic stress disorder and suicidal ideation among Wenchuan earthquake survivors found that survivors were at high risk for suicidal ideation eight years after the earthquake and that post-traumatic stress disorder, was a significant contributory factor to developing suicidal ideation. The study highlighted the importance of ensuring mental health care for survivors post the occurrence of natural disasters. Similarly, Gerstner, Lara-Lara, Vasconez, Viscor, Jarrin and Ortiz-Prado (2020:236) in his study of the 2016 earthquake in Ecuador, South America found a higher prevalence of suicidal ideations and suicidal behaviour, posttraumatic stress, depression and anxiety amongst survivors especially in the presence of large economic losses suffered by the family.

2.9 Global view of floods

Flooding is the most frequent and widespread natural disaster that accounts not only for the largest number of deaths, but also has serious consequences for health, social wellbeing and economic stability (Huang, Yin, Slater, Kang, He and Liu 2024: 1; Liu, Du, Wang, Deng, Yan, Qin, Liu and Liu 2024: 410). The unpredictable nature of floods combined with the growing frequency and intensity that is linked to climate change, makes floods a major concern for communities across the globe (Calvo-Solano and

Quesada-Román 2024: 2). In the last two decades, floods have accounted for 44% of all disaster events affecting 1.6 billion people worldwide. This is the highest figure attributed to any disaster type with the highest impacts occurring in Asia, Africa and the Americas (United Nations 2020: 17). Satellite data for 2000 to 2015, has shown that the population residing in areas at risk of flooding, has risen from 58 million to 86 million and the global proportion of individuals affected by flood disasters continues to rise each year (Tellman, Sullivan, Kuhn, Kettner, Doyle, Brakenridge, Erickson and Slayback 2021: 1).

From 1990 to 2022, amongst the countries where floods have occurred, the most affected country was China. Over 1.9 billion people were affected, as they recorded the second-highest number of flood-related deaths, totalling 30,890. They also suffered the greatest economic losses, estimated at US\$442 billion (Liu *et al.* 2024: 411). The second most affected country was India (United Nations 2020: 17), which impacted over 629 million people, resulted in the largest number of deaths of over 46 506 people and experienced over US\$115 billion in damages (Liu *et al.* 2024: 411). Amongst the flooding events with the highest mortalities in the past two decades, the deadliest flooding events occurred in June 2013 in India which resulted in over 6000 deaths in May 2004 in Haiti, with 2665 fatalities and in July 2010 in Pakistan where 1985 people lost their lives (United Nations 2020: 17).

The cost to the economy of these countries has been great, with China suffering the greatest economic losses, estimated at US\$442 billion, the United States of America experiencing over US\$ 135 billion in economic damages and India experiencing US\$115 billion in damages (Liu *et al.* 2024: 411). In terms of gross national profit which affects the lives of people in the country, the most devastating impacts of flooding were felt in developing countries as seen with the 1998 and 2004 floods in Bangladesh which cost the country 7% of their gross national profit owing to the widespread destruction, disrupting livelihoods, displacing millions and severely straining national resources (Svetlana, Radovan and Ján 2015: 651).

The World Meteorological Organisation (2021: 16) further highlighted that the 2008 Storm Nargis in Myanmar and the storms that struck the United States of America

namely Katrina, Harvey, Maria, Irma and Sandy from 2005 to 2017 were substantial causing many deaths and economic losses. Numerous other studies have detailed equivalent flood events across Europe and Asia (Azeem, Cheema, Shahid, Al-Mamun, Rackimuthu, Rehman, Essar and Lee 2023: 1; Chen, Giese and Chen 2020: 6; Paprotny, Sebastian, Morales-Nápoles and Jonkman 2018: 3). The impact of these events is however preventable since flood management has sustainable and economically viable mechanisms of prevention such as the building of dams and proper drainage systems.

Africa is especially vulnerable to the impact of climate change which has been escalating over the past few decades. This has resulted in a rise in severe weather events (Ayejoto, Agbasi, Nwazelibe, Egbueri and Alao 2023: 1). Data from the Africa Centre for Strategic Studies (2022: 3) reflects that flood occurrences in Africa, since 2000, have accounted for 66% of disasters documented on the continent and have been concentrated in countries in East Africa such as South Sudan, Sudan, Somalia, Ethiopia and Kenya. Since the 1990s, Sub-Saharan Africa, has been the only region globally that has shown increasing rates of flood-related deaths, and by 2020, floods had affected over eight million people and caused over 1200 deaths.

According to the International Disaster Database, North African regions are more severely affected by flood disasters and in the last decade have experienced double the number of fatalities, than Spain, France, and Italy (International Disaster Database 2024). A review conducted by Aliyu, Liman-Hamza and Lawal (2023: 13) on floods in Sub-Saharan Africa found that there was an increase in the frequency and intensity of rainfall in the region. The effects were made worse by urban growth, increase in population size, and changes in the use of land. The review further found that floods in the region did not affect just the economy, but also the short-term and long-term health and well-being of people (Aliyu *et al.* 2023: 20). Similarly, a study by Zehra, Mbatha, Campos, Queface, Beleza, Cavoli, Achuthan and Parikh (2019: 1) found in the coastal city of Maputo in Mozambique, there was an increase in disastrous flooding events due to the increase in rainfall and sea levels, that has had adverse impact on infrastructural services including supply of water, solid waste management, housing and access to emergency services. Kabanda (2020: 134) also iterated that the rising

sea levels related to rainfalls, storms and floods increased the destruction to roads and infrastructure, such as buildings and harbours in the coastal areas of Dar es Salaam. The social and economic impact of frequent flooding in African cities are steadily worsening daily resulting in increased vulnerability to loss of livelihoods, displacement, public health crisis and infrastructural damage (Baddianaah 2023: 1).

Flooding is expected to become more frequent around the world as global temperatures and precipitation rises (Rogers, Maneta, Sain, Madaus and Hacker 2025: 1; Tabari 2020:1) and more populations move into the cities (Balaian, Sanders and Abdolhosseini Qomi 2024: 1). These events will continue to have an adverse effect on the health and well-being of families and communities (Ebi, Vanos, Baldwin, Bell, Hondula, Errett, Hayes, Reid, Saha and Spector 2022: 10). Flooding within the South African context is discussed in the sub-section that follows.

2.10 Flooding in the South African context

South Africa is particularly vulnerable to flood hazards and typically experiences devastating floods every two years. Severe flood events have occurred historically every ten to fifteen years, however, the intensity and frequency of these severe flood events has been rising (Grab and Nash 2023: 476; Dube *et al.* 2021: 453). From 1950 to 2021, South Africa recorded forty significant flood disasters especially on the East Coast which has been battered by floods in the last three decades (Govender, Reddy and Pillay 2025: 2). An analysis by the Council for Scientific and Industrial Research (CSIR) in South Africa iterated that South Africa has been experiencing flood events more frequently with over seventy-seven major floods that occurred from 1980 to 2010 (Council for Scientific and Industrial Research (CSIR) 2019: 3). Munyai, Chikoore, Musyoki, Chakwizira, Muofhe, Xulu and Manyanya (2021: 2) highlighted that the annual risk of flooding in South Africa was 83% with significant population vulnerability that was driven by economic constraints and the geographical location of housing.

The coastal towns and cities are particularly susceptible to the impact of extreme weather events such as flooding which is often produced by tropical cyclones, enhanced tidal activity and storm surges (Barnes, Turner, Ndarana and Landman

2021: 1). Dube *et al.* (2021: 454) asserted that in South Africa, the increased frequency and strength of extreme weather events was a concern due to the poor socio-economic circumstances confronting many coastal communities.

A study conducted by Agonafir *et al.* (2023: 1) found that flooding in urban cities was increasing with severe consequences for people and infrastructure. As with other countries, in South Africa a large portion of the population resides in urban cities. By 2021, over two-thirds of the South African total population resided in urban areas and cities (Statistics South Africa 2025). By 2030, 71% of the South African population, would be residing in urban cities (Gardner 2018: 27). Urban cities in South Africa have inhabited areas that are a mix of urban and rural characteristics (Sutherland, Scott and Hordijk 2015: 6) thereby increasing their vulnerability to flooding events. In South Africa, the most vulnerable Provinces that have been affected by flooding are the Eastern Cape, KwaZulu-Natal, North-West and Limpopo primarily, as they have large rural areas and the Eastern Cape and KwaZulu-Natal have cities located in the coastal areas (Nhamo, Chapungu and Mutanda 2025: 8).

Literature on flooding events in South Africa reflects the increased vulnerability of the country. Munyai (2021: 2) opined that the growth of the population, expansion into the rural-urban areas and the development of settlements have increased the severity and frequency of flooding events. Fitchett, Hoogendoorn and Swemmer (2016: 187) similarly described the vast economic losses caused by destruction to farms, businesses and infrastructure that occurred because of the 2012 Tropical Storm Dando in the Limpopo Province.

The 1987 floods in KwaZulu-Natal caused immense damage to the infrastructure of roads and bridges, which resulted in the death of 388 people and the displacement of 68 000 others (Grab and Nash 2023: 14). Mudefi (2023: 1) stated that the 2019 floods in KwaZulu-Natal, resulted in the death of 80 people, the displacement of over 1400 people and damages over US\$ 71 million.

Research undertaken by Dube *et al.* (2021: 457) on the flooding trends and impact on communities residing in coastal areas in the Western Cape Province, found that over

the past four decades the occurrence of floods, was higher especially in areas close to the coast, with the highest number of floods recorded in 2008. The researcher attributed the increase in floods, to climate change.

Climate change and the resultant heavy rainfalls in South Africa, led to the flooding of informal settlements across the country. Dlamini *et al.* (2024: 2) and Musyoki, Murungweni and Thifhulufhelwi (2016: 3) discussed the vulnerabilities of residents in informal settlements due to the floods, which caused massive destruction to their homes because they were built with poor materials. Williams *et al.* (2019: 173) further maintained that in South Africa, communities in informal settlements were vulnerable to flood risks since they resided in hazardous areas and were usually from a disadvantaged socio-economic background.

In April 2022, the KwaZulu-Natal Province, which is situated on the east coast of South Africa, received more than 300 mm of rain over 24 hours (Thoithi *et al.* 2022: 1). The extreme rainfall and resultant flooding were regarded as an event with high mortality in the region (Grab and Nash 2023; 3). There were high socioeconomic losses accompanying the flood events with over 435 fatalities and 40 000 people displaced over the period. More than 4000 homes in the eThekweni informal settlements were destroyed (Sutherland 2024: 17). Essential infrastructure was damaged including bridges, roads and two major highways (South African Government 2022c: 1). Further damages were caused to infrastructure such as mobile network infrastructure with approximately 400 cell phone towers, destroyed due to power outages and fibre optic cables that had become submerged (Pinto *et al.* 2022: 2). Schools and attendance at schools were also affected with over six hundred and thirty schools affected in the KwaZulu-Natal Province, in the areas affected by flooding. Over 124 schools were damaged which consequently impacted approximately 270 000 students (South African Government 2022c: 1). In addition, considerable parts of eThekweni, disruptions to electricity and water supply persisted for several days due to damage to water treatment facilities and power generation stations (Pinto *et al.* 2022: 2). The expected costs to property damage were 17 billion rands (Mudefi (2023: 1).

The unprecedented rainfall that affected the Province on the 11 April 2022, was equal to 75% of South Africa's average annual precipitation and roughly half of eThekweni's precipitation (Pinto *et al.* 2022: 19). The South African weather services and eThekweni municipality indicated that the public was warned of the impending rainfall through news reports. Many residents however reported that the municipality had failed to provide support to the communities with early warnings, that would have allowed people especially those living in low lying areas to prepare and evacuate. This indicated that these public warnings had reached people partially and they did not understand how to respond appropriately (Pinto *et al.* 2022: 19).

2.11 Effects of flooding

The floods cause significant distress, particularly in developing countries where they negatively affected countries with limited financial resources. Around 70 % of all disasters worldwide are related to hydro-meteorological phenomena, with flooding being one of the largest threats to sustainable development (World Meteorological Organisation 2022: 1).

Flooding has multiple negative effects on individuals, communities, and the environment. Some of the common effects of flooding include damage to property, loss of crops and livestock, disruption of transportation and communication systems, and the displacement of people (Nicholls, Zanuttigh, Vanderlinden, Weisse, Silva, Hanson, Narayan, Hoggart, Thompson and de Vries 2015: 9). Floods can also lead to a variety of health hazards, such as waterborne diseases, food contamination, and insect-borne illnesses (World Health Organisation 2022). According to Ntanganedzeni and Nobert (2021: 7) individuals, communities and households are impacted, at different levels by floods. The physical impact of the flood water can cause loss of homes and damage to roads as described by Lu, Chan, Chan and Chen (2024: 9). Indirect impacts can be described as cases that occur outside the flood zone and include services such as the disruption to the supply chain. In addition, flooding can have ecological impacts, such as changes to water quality, soil erosion, and damage to ecosystems. It is important to take precautions and be prepared for flooding, to minimize its impacts. In line with this Sedighi, Varga, Hosseinian-Far and Daneshkhah

(2021: 2) assessed the economic impact of flooding on mental health through the use of Bayesian Networks. They found that flood disasters impact people both directly and indirectly with direct impacts resulting soon after the flooding event and indirect impacts occurring after the flooding event and or outside the affected areas. The researchers further said that the impact of flooding can be differentiated into tangible and intangible factors.

Indirect losses occurred over a longer period post flooding event. The researchers further explained that the losses depended on whether they could be assigned monetary values. These were further defined as either tangible or intangible and primary (a loss occurring directly from the flooding event) or secondary (a loss occurring one step removed from the flooding event). The diagram below reflects the flood loss classification and impact of floods (Hammond, Chen, Djordjevic, Butler and Mark 2015 in Sedighi *et al.* 2021: 2).

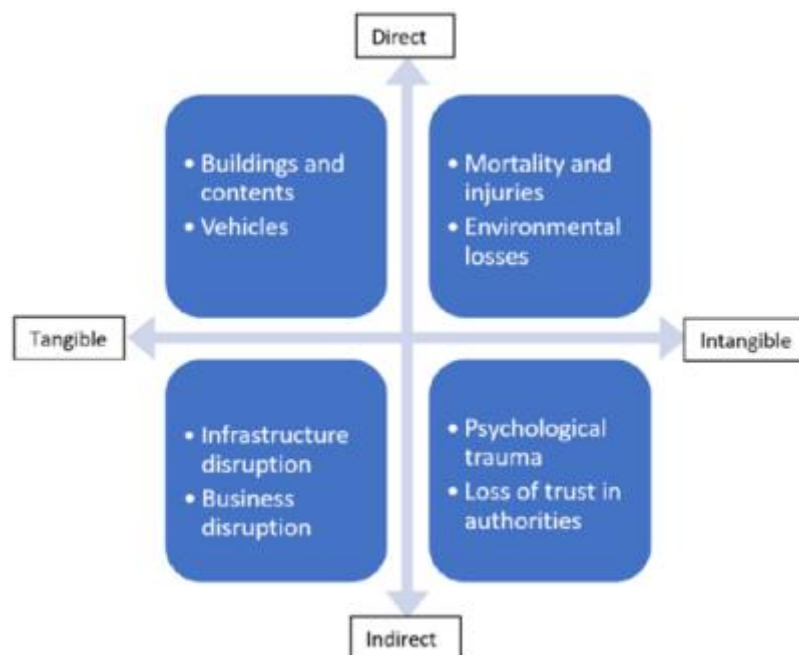


Figure 2.3: Impact of floods showing flood loss classification

Source: (Sedighi *et al.* 2021: 2)

2.11.1 Environmental and infrastructural effects

Natural disasters have significant impacts on infrastructure, particularly on homes and roads. Earthquakes, landslides, and floods can cause extensive damage to road networks and homes (Xu, Liu-Zeng, Allen, Zhang and Du 2021:1; Sheldon and Zhan 2019:32). The consequences of these disasters extend beyond physical destruction, affecting the socio-economic structure of communities (Gajanayake, Khan and Zhang 2020: 11). Furthermore, the destruction of roads can isolate regions, hindering the distribution of resources and the evacuation of disaster victims. Regarding homes, the resilience of properties in disaster-prone areas are essential to reduce economic losses and ensure the safety of residents (Mansoor, Anuar, Mahdzir, and Adnan 2023: 262). However, many homes and public infrastructures in such areas are not adequately prepared to withstand the impact of natural disasters as they are built with inferior materials (Dlamini *et al.* 2024: 2).

Throughout history floods have caused the largest fatalities and economic losses with the highest risk for flood disasters, existing in urban and peri-urban areas across the world (Ramiamanana and Teller 2021: 2). They have caused damage to physical infrastructure such as roadways, tele-communication networks, buildings, housing and social services. In addition, the environmental impact of flooding is wide, ranging from the inclusion of household waste into the water systems which contaminate water supplies and wildlife habitats to morphological changes to the river courses, with floods of greater depth causing more damage.

The damage to infrastructural services affects the economic activities that depend on the infrastructure leading to disruptions including loss of houses, businesses, roads, bridges, power plants, electricity, communication, education and health care (Mavhura and Aryal 2022: 7). Njogu (2021: 4) conducted a survey of twenty-seven counties in Kenya, to evaluate the impact of floods on households, as consumers of infrastructure. The study found that 24% of main roads were not passable due to rainy seasons which resulted in increased costs of accessing products and services. Many countries experienced increased power outages during floods and areas with semi-permanent

housing structures experiencing the highest levels of household destruction and householder deaths in such structures (Njogu 2021: 5).

In a study that focused on the effects of flash floods on transportation infrastructure, Diakakis, Boufidis, Grau, Andreadakis and Stamos (2020: 11), found that many road networks, bridges and river crossings were inaccessible. This resulted in electricity outages, damage to sewerage systems, manhole covers being displaced, lighting poles collapsing, traffic lights being damaged and debris being deposited on the sidewalks, which consequently affected pedestrian safety.

Several other studies have also documented the increase in vulnerability of cities to the effects of floods, due to urban growth, poor planning, and drainage systems (Ramiamanana and Teller 2021: 1; Echendu 2020: 8; Cirella and Lyalomhe 2018: 6). De Oliveira, Battemarco, Barbaro, Gomes, Cabral, de Oliveira Pereira Bezerra, de Araújo Rutigliani, Lourenço, Machado and Rezende (2022: 2) posited that urban drainage systems are typically designed to handle specific flood events. When these events exceed the design parameters, the drainage capacity is exceeded. Garbage accumulation (Chandrasena, Yusof, Liyanapathirana, Mustafa and Mustaffa 2017: 1407), sedimentation and soil runoff which settle in storm water drains hinders drainage (Asiedu 2020: 32). De Oliveira (2022: 9) argued that the impact of flooding and the damage to infrastructure, in turn negatively affects housing prices. Further, the damage to the sewage systems impacts the quality of drinking water.

In destroying infrastructure, flooding has aggravated the economic status, especially of people who live in informal settlements (Kikwasi and Mbuya 2019: 629). Mensah and Ahadzie (2020: 9), in a systematic review of literature on the causes, impact and coping strategies of floods in Ghana, found that because power supplies were disturbed, bridges and roads were damaged, communities isolated and their economic activities disrupted. This further affected the economic vulnerability of communities, as their daily life was interrupted.

2.11.2 Disruption to families and displacement

Floods caused by extreme weather events are one of the main causes of displacement, particularly in low and lower-middle-income countries, which compels people to change homes either temporarily or permanently (Vestby, Schutte, Tollefsen and Buhaug 2024: 1). This is compounded by socioeconomic vulnerability and the institutional lack of coping capacity which increases the risk of displacement (Internal Displacement Monitoring Centre 2018: 33; Mora, Spirandelli, Franklin, Lynham, Kantar, Miles, Smith, Freel, Moy and Louis 2018: 1062). Over 21 million people in the world were displaced in 2021, due to heavy rains and flooding events (Internal Displacement Monitoring Centre 2022: 16). This section will explore the multifaceted consequences of flood related displacement, highlighting its effects on mental health, physical well-being and disruption to family stability and children's schooling.

Beyond the physical movement of individuals and families, the displacement due to natural disasters such as flooding has profound psychological consequence. A qualitative study, which examined the effect of displacement, following the 2018 St John River Flood in Canada, found that individuals who had suffered displacement from their homes or other damages, had suffered adverse psychological effects, both during and after the flood (Woodhall-Melnik and Grogan 2019: 1). The researchers further found that the victims experienced exhaustion, stress, anxiety, worry and uncertainty about the future. The word "stress" was used in multiple ways to describe the financial strain, evacuation experiences, rebuilding efforts and recovery of personal possessions of the victims. Carias, Johnston, Knott and Sweeney (2022: 2072) argued that urban populations living in poverty are at increased risk of unfavourable psychological outcomes following floods.

Similarly, Munro *et al.* (2017: 1) conducted a study in the United Kingdom, on the relationship between flooding and mental health outcomes, one year after a flooding event which had affected five counties. The study found that people displaced from their homes suffered more from depression and post-traumatic stress disorder, than non-displaced people. Additionally, the scores for depression and post-traumatic

stress disorder were higher amongst the populations that did not receive any advanced warning of the flood (Munro *et al.* 2017: 5).

In addition to the mental health effects the displacement, due to floods had severe impacts on the physical health and access to essential services of communities. Munteanu, Pistol, Guja, Carniciu, Popescu-Spineni and Moldoveanu (2018: 67) conducted a study in Romania on the effects suffered by flood affected victims, as a result of displacement. The study found that most displaced persons required long term shelter in tents. People were found to experience acute respiratory infections, physical injuries and psychological trauma during the displacement. The overcrowding combined with poor hygiene contributed to outbreaks of diseases such as measles, influenza and vector diseases.

Building on these findings, Waddell *et al.* (2021: 4) described in a review the health effects following hurricanes. They reported that there was an increase in diseases, making timely access to healthcare critical. The researchers asserted that people that were evacuated before and after the hurricane, lacked access to care and shelters were crowded, which led to a worsening of their health. This was especially true for people with pre-existing conditions (Waddell *et al.* 2021: 4). An earlier study conducted by Kessler, Galea, Gruber, Sampson, Ursano and Wessely (2008: 6) on the effects of Hurricane Katrina on patients with chronic medical conditions, found that over twenty percent of the participants had reported disrupting at least one of their medical treatment protocols after the hurricane. Additionally, the disruption of treatment was three times more likely, when survivors experienced housing unpredictability and had no relatives in the area.

Children and adolescents often face unique risks following flood related displacement. Berger, Carroll, Maybery and Harrison (2018: 1) described the effects of disasters on displaced youth in Victoria, Australia. The displacement resulted in a relocation of their schools which in turn exacerbated children's emotional vulnerabilities. The study further documented that the disruption was associated with increased stress, aggression and frustration within families and led to children's educational progress being interrupted, due to a decline in school attendance (Berger *et al.* 2018: 5).

Similarly, the Internal Displacement Monitoring Centre (2022: 113) compiled an international report that focused on the internal displacement of children. It revealed that displacement negatively affected children's schooling, well-being, security, social life and future livelihood opportunities. The report detailed that in more than half the households surveyed in Afghanistan, less than half of school going children were in formal schooling in comparison to children from non-displaced households (Internal Displacement Monitoring Centre 2022: 114).

Of significance is that the adverse effects of displacement are not distributed equally across all populations, as underlying socioeconomic and structural vulnerabilities such as poverty and informal housing structures intensify the effect of floods. Kakinuma *et al.* (2020: 1) conducted a study that utilized modelling of flood exposures to quantify the flood-induced population displacements in the world. The study concluded that strengthening the resilience of communities prone to natural disasters such as floods, is important, as population displacement compromises human security. The study further found that African countries are at a higher risk of experiencing displacements due to floods due to their lower income status. In addition, as people move from rural areas to the urban areas due to unstable social conditions, poverty and the search for work, they are often compelled to live in unsafe dwellings and areas around the city, that are more vulnerable to the effects of floods (Kakinuma *et al.* 2020: 5).

Several other studies have reflected that urbanisation characterised by rapid unplanned growth, increases the susceptibility of low-income urban populations to natural disasters (Dlamini *et al.* 2024: 2; Anwana and Owojori 2023: 13; Williams *et al.* 2019: 157). John (2020:1) explored the capacities and constraints of families residing in a flood prone area in an informal township in Tanzania and found that the biggest urbanization rates of most of the emerging countries, including Africa are linked to inadequate urban planning. As a result, the urban growth occurs under conditions marked by poverty, illegality and unplanned settlements, all of which are at increased risk to the effect of flooding.

In addition to the impact on mental and physical well-being and family cohesion caused by displacement, flooding also disrupts access to essential resources. It impacts food, thereby exacerbating food insecurity amongst vulnerable populations.

2.11.3 Food insecurity

Food insecurity arises when food systems fail to ensure access to sufficient, satisfactory, and safe foods that are nourishing to people (Hadley, Wheat, Rogers, Balakumar, Gonzales-Pacheco, Davis, Linstadt, Cushing, Ziska and Piper 2023: e242). The availability of food refers to the provision of food and the quantity of food present in the supply system. This includes production, storage and imports, while access refers to a household's means of obtaining food that is available, their ability to produce their own food or their purchasing power (Reddy, Devi and Anbumozhi 2019: 293).

Numerous studies have concluded that natural disasters, such as floods result in devastating effects on communities across the globe and deprive affected people of adequate food (Atanga and Tankpa 2021:9; Akukwe, Oluoko-Odingo and Krhoda 2020: 128; Tirivangasi 2018: 6). This is due to several issues including the movement of individuals from their homes, death of primary income earners, reduced agricultural production and a rise in the cost of food (Tirivangasi 2018:1). Consequently, flooding is a significant factor contributing to poverty (Echendu 2020: 4).

As discussed earlier, the frequency, extent and magnitude of flooding together with its consequential impacts is gaining attention. Of particular concern is the impact on agriculture and food security. A study conducted by Reed, Anderson, Kruczkiewicz, Nakamura, Gallo, Seager and McDermid (2022:1) evaluated the impact of flooding on food security across 16 countries in Africa during the period 2009 – 2020. It found that approximately 5.6 million people or 12% of the people that were subjected to food insecurity was because of flooding events. Additionally, the flood events could impact food security in the short term, as well as in the months after the flood (Rosinger, Rosinger, Barnhart, Todd, Hamilton, Arias Cuellar and Nate 2023: 13; Echendu 2020: 5). Utilising data from the Famine Early Warning System Network, the study further

found that flooding through its numerous pathways negatively affects food security. Studies have also described how flooding events result in destruction to crops and livestock, hence decreasing the quantity of food available to households (Ahmad and Afzal 2021: 1; Atanga and Tankpa 2021: 9; Jonathan, Owolabi, Olatunji, Duntoye and Henshaw 2020: 5; Akukwe *et al.* 2020: 124). Research conducted by Codjoe and Owusu (2011: 8) and Ramakrishna, Gaddam and Daisy (2014: 18) further described how the damage to road infrastructure including bridges, roads and storage facilities had prevented access to food. A study by Olanrewaju, Chitakira, Olanrewaju and Louw (2019: 7) revealed that irrespective of direct damages to crops and food production, the damage caused to infrastructure and sewage systems compromises the quality of water resulting in the lack of clean drinking water during flood events

Pacetti, Caporali and Rulli (2017: para. 1 line 3) reported that floods had a major impact on agriculture and threatened food security. It caused a reduction of crops, food supply and availability in Bangladesh and Pakistan. Hossain, Ahmed, Rahman, Sammonds, Zaman, Benzadid and Jakariya (2021: 7) examined food insecurity in households following a cyclone in Bangladesh. They shared that in the aftermath of Cyclone Amphan, 40% of households experienced critical food insecurity, with the elderly and poor people being affected the most. The study further found that there was a greater prevalence of suicide ideation in households that had severe food insecurity. In another study in Ghana Atanga and Tankpa (2021: 7) found that floods and erosion caused by floods had resulted in total crop destruction. Similar results were documented in a study in Nigeria by Week and Wizer (2020: 2) where food insecurity following flooding was found to affect the livelihoods of residents, causing malnutrition and a reduction in income. Gautam and van der Hoek (2003: 18) further argued that during and after a flood, electricity supply can be hampered resulting in refrigerators malfunctioning and a consequent loss of food. In addition, pests that such as rats, that have become displaced can contaminate food sources. Besheer 2019 (cited in Mathew 2021b: 4) wrote that the floods experienced in Zimbabwe in 2017, presented a challenge for farmers, as they could not get their agricultural produce to the market or urban areas, as the roads were washed away. This posed a threat to food security for both urban and rural citizens. Locally, Tirivangasi (2018: 970), described how climate change affected women in rural areas in the Makhado municipality in the

Limpopo Province. Their study found that women and children were affected the most, as their homes were destroyed, income reduced, and the availability of food diminished.

2.11.4 Physical Health and Mortality

Natural disasters are diverse events which subjugates people to multiple risks and hazards. Over the past two decades, more than 2 million people have been wounded during by natural disasters (Bartholdson and von Schreeb 2018: 103). As stated previously, 44% of natural disasters are due to floods with drowning being a leading cause of death (United Nations 2020: 9).

Furthermore, the World Health Organisation Global Report, on drowning, detailed that there was an increase in the number of people exposed to hazards due to the severity of floods, coupled with unplanned urbanisation globally. The risk of drowning increases especially in low- and middle-income countries, where warning and evacuation systems are still developing in these contexts (World Health Organisation 2024: 24).

According to the World Health Organisation (2022) fatalities had occurred from injuries, cardiac distress, electrocution, poisoning from carbon monoxide or from fires which were triggered by flooding. Similarly, Kenyi (2020: 22) described the public health effects of floods, saying that the most frequent and immediate health effects, post the onset of flooding, was death due to drowning and injuries. This is followed by illnesses from infections especially in areas with poor hygiene and sanitation. A review of scientific evidence conducted by Kovats and Akhtar (2008: 165) on the effect on climate change, especially flooding and heat waves on health in Asian cities, found that it had negative effects on the health of people. In addition, the study found that people living in poorer conditions, had experienced a greater degree of infectious and viral diseases such as leptospirosis in informal settlements, cryptosporidiosis and typhoid fever in poorer countries such as India and Bangladesh (Kovats and Akhtar 2008: 169).

Rieckmann, Tamason, Gurley, Rod and Jensen (2018: 3) further conducted a study on the association of cholera outbreaks with regards to floods and droughts in sub-Saharan countries. The researchers explored data from EM-DAT, the international disaster database from 1990 to 2010 and found that cholera outbreaks had increased during flood periods, due to the sanitation systems that were overfilled, environmental and water source contamination, as well as overcrowding which exacerbates hygiene and sanitation issues.

Elsanousi, Elmahi, Pereira and Debacker (2018: 1) undertook an observational retrospective study on the frequency of malaria following the 2013 floods, in the Almanagil Locality in Sudan. The study used information from the sentinel surveillance system, as well as the countries health management information system. They compared malaria data sets from the 2013 flooding with those from the previous two non-flooding years, 2011 and 2012. The researchers found that there was a notable rise in the number of malaria cases during the 2013 flash floods, with the highest impact seen amongst children under 5-years of age.

Sara, Haji and Gebretsadik (2018: 4) conducted a study to examine the outbreaks of scabies in the East Badewacho District in Southern Ethiopia. The researchers conducted face-to-face interviews with individuals and families with children and analysed clinical data sets as well. Data obtained from the study indicated that the risk of scabies infections was 22 times more, amongst people who lived in households impacted by flooding. This could be attributed to the resultant displacement that occurs, following a flooding disaster with overcrowding and diminished personal hygiene.

In a systematic review of literature that includes eleven studies related to floods and physical injury, Bartholdson and von Schreeb (2018: 106) found that drowning was the most frequent reason for death, following flood disasters. A study conducted by Noe, Schnall, Wolkin, Podgornik, Wood, Spears and Stanley (2016: 1) on injuries and illnesses treated by the American Red Cross Disaster Health Services, during Hurricanes Gustav and Ike, evaluated emergency visits following the two hurricanes. Of the 3863 patient visits, 14% were due to injuries which comprised of sprains, cuts,

falls, and contusions. Of these, lacerations accounted for the greatest number of injuries (Noe *et al.* 2016: 4). A study conducted on households affected by the 2008 flood in Vietnam, described the adverse effects suffered by those affected, after the first month following the disaster. It documented that most injuries, included minor cuts and lacerations, were caused by survivors falling down (Bich *et al.* 2011: 5).

Physical injuries however were few and tended to be mild. These included sprains, fractures and lacerations with most of the injuries, occurring during clean-up activities. A review on global health on the impact of flooding, that was conducted by Ahern, Kovats, Wilkinson, Few and Matthies (2005: 37), found that flood related injuries could rise as individuals attempted to leave the flood danger areas or try to remove their possessions and valuables from danger, with further injury occurring when individuals returned to clean-up their homes. This occurred because of unstable buildings and electrical malfunctioning. The literature reviewed, reflected that non-fatal injuries were less likely reported or identified.

In a study related to Hurricane Katrina, Zacher (2021: 127) found that three physical health symptoms namely headaches, back pain, and stomach disorders were associated with the natural disaster. The study further found that distressing incidents experienced during disasters such as Hurricane Katrina triggered the occurrence of new physical symptoms.

Floods can also have medium health impacts and long-term health impacts, including impacts on non-communicable diseases due to the non-availability of chronic medications, increase in mental health effects, risk of infection due to microorganisms and trauma, loss of healthcare and other infrastructure (Paterson, Wright and Harris 2018: 1450). Ryan, Franklin, Burkle Jr, Aitken, Smith, Watt and Leggat (2016: 8) reported similar findings in their systematic review of literature from developed countries including The United States of America, Japan and the United Kingdom. The researchers found that flood disasters had a substantial effect on chronic health conditions or non-communicable diseases due to medication noncompliance, because of difficulty in accessing health services.

More recently, similar results were found in a review of literature conducted by Ghazanchaei, Khorasani-Zavareh, Aghazadeh-Attari and Mohebbi (2021: 1150). People with non-communicable diseases (including cardiovascular disease, diabetes, chronic respiratory disease, cancer and mental health) were compared with those with good physical health. The people with non-communicable diseases were found to show substantial ill health outcomes. In a study on the relationship between flood disasters and cardiovascular events following a typhoon in Japan, Sunohara, Miura, Komatsu, Hashizume, Momose, Kono, Motoki, Mochidome, Kasai and Kuwahara (2021: 448) observed that there was a significant increase in the number of reported cardiovascular diseases such as hypertension and dyslipidaemia following the flood disaster in 2019, with 82 more patients reporting same than in the previous two years. Studies have shown that water damage in residential homes, can produce fertile environments for various species of moulds and fungi that can lead to the exacerbation of respiratory diseases such as chronic obstruction pulmonary disease, asthma, and allergic rhinitis (Hayes, Jhaveri, Mannino, Strawbridge and Temprano 2013: 135; Tischer, Chen and Heinrich 2011: 812). Saulnier, Hanson, Por, Mölsted Alvesson and Von Schreeb (2018: 5) in a study on the effects of flooding on health in 11 districts in Cambodia, found that of the two hundred thousand patients admitted and the five million cases for outpatients, between 2008 and 2013, acute respiratory infections and diarrhoea accounted for the largest number of hospital visits. In contrast, non-communicable diseases accounted for only 0.04% of visits.

The physical effects of flooding are only a broader impact of flooding, which includes psychological effects. This is explored in the section that follows.

2.11.5 Psychological impact of flooding

Elderly people are particularly vulnerable when there is a disaster. In a study on the health effects on the elderly impacted by the 2011 Bangkok floods, Chompunud and Imkaew (2019: 5) found that almost a quarter of the participants had suffered psychological health effects such as sleep disturbances, persistent mental strain, impaired focus, and a sense of dissatisfaction. These findings are consistent with

previous studies on psychological impacts of flood disasters. These are reviewed in the sub-sections that follow.

Sonpaveerawong, Limmun and Chuwichian (2019: 258) conducted a study on the mental health issues among the individuals of flash floods and landslides in Southern Thailand. The study found that almost half the participants had a high prevalence of post-traumatic stress disorder and depression. Participants also suffered from suicide risk and other risky behaviours such as alcohol use. The study found that the risk factors that affected mental health problems included age, sex, existing physical health issues, perception of the psychological effects, physical infections and injury.

Similar results of post-traumatic stress disorder were seen, within a cross-sectional survey of adults, conducted six months after a flooding event in Australia by Matthews *et al.* (2019: 367). The survey found that 22% of the participants indicated that they continued to be distressed about the flood, 16% with anxiety, 15% with a probable post-traumatic stress disorder, 15% with depression and 7% with suicidal ideation. Furthermore, the study found that respondents who had experienced socio-economic challenges prior to the flood, were more likely to be vulnerable to exposure and to have a higher risk of mental health challenges, after the flood event.

Disasters can create profound physical and psychological impacts amongst survivors. Research describing the psychological impact of floods on people have shown that grief and depression were common amongst survivors (Wani *et al.* 2020: 27; Thomas *et al.* 2019; Neelofar *et al.* 2018: 3; Jermacane, Waite, Beck, Bone, Amlôt, Reacher, Kovats, Armstrong, Leonardi and James Rubin 2018: 5). A study conducted in Kerala India, on post-traumatic stress disorder amongst adolescents following the 2018 floods, found that 50% of the sample had reported experiencing difficult memories of the flood, with the prevalence of post-traumatic stress disorder, being 35% (Mathew *et al.* 2021a: 462). Findings of post-traumatic stress disorder were also documented in a study, conducted amongst survivors of Hurricane Katrina in the United States of America (Meltzer *et al.* 2021: 8). Song *et al.* (2025: 5) also found in a review of literature on the effects of flooding on the mental health of affected people, that the most common ailments included depression, anxiety, post-traumatic stress disorders and

sleep disturbances. These feelings were further compounded by social isolation and limited social networks that were available during this period.

Neelofar *et al.* (2018: 3) argued that in addition to anxiety and depression, people presented with other psychosocial problems such as excessive smoking patterns, constant thoughts of the flood incident, complicated grief, fatigue, insomnia, anger, fluctuating moods, suicidal ideation, excessive drinking and distressing dreams. Abass, Gyasi, Katey, Frempong and Garsonu (2022: 4) conducted a study on the psychological distress experienced amongst Ghanaian adults, following exposure to a flood. Their study revealed that the prevalence of psychological distress had increased with repeated flood exposure. They also found that 91 % of participants with intense distress, had reported exposure to floods as compared to the 68% who were not exposed to flood related disasters.

Whilst there have been studies reflecting the effects of flooding and natural disasters in Southern Africa, these have been limited to the effects on economies, infrastructure and health (Mugambiwa and Makhubele 2021: 809; Kabir and Hossen 2019: 48). Studies related to the psychological impact of floods on survivors in South Africa however have been sparse. An expert review conducted by Barnwell (2021: 20) documented the psychological effects of flooding in South Africa. These conditions increased mental health issues, such as depression, anxiety and post-traumatic stress disorder. He further elaborated that following the 2019 Durban Easter weekend floods, which resulted in the death of seventy-one people, the municipality was unable to meet the needs of the community for months thereafter. This review reflected the need for the government to address the mental health impact of natural disasters such as flooding, to decrease trauma for current and future generations (Barnwell 2021: 24).

To understand the effect of flood related disasters on families, it is also important to understand its effect on children (Makwana 2019: 3091). Makwana (2019: 3091) posited that disasters cause victims to be placed in a state of shock and that this trauma disrupts the functioning of individuals and families. The effects on children specifically, are discussed in the sub-section that follows.

2.12 The effects of flooding on children

Flooding disasters have also affected many aspects of the lives of children, particularly their physical and mental health and education (Munsaka and Mutasa 2021: 4; Agabiirwe, Dambach, Methula and Phalkey 2022). A recent systematic review of the effect of floods on malnutrition amongst children in low-and middle-income countries, identified fourteen studies which showed an association between flood exposure and under nutrition. It found that children's physical health had been stunted. However, all these studies were conducted in South Asia, with no studies related to same in Sub-Saharan Africa. These studies were also inconclusive for short and intermediate periods following flooding, but stunting was reported frequently as a long-term effect of malnutrition following flooding (Agabiirwe *et al.* 2022: 21; Alfaiate 2009: 4).

A review conducted by Wang, Asare, Pitzer, Dubrow and Chen (2023: 1206), which explored the risk of diarrhoea amongst young children after the floods, was done in low-and middle-income countries. The authors analysed data from multi-cluster surveys conducted across 43 countries, during a 10-year period and found a positive link between exposure to floods and an increased risk of diarrhoea risk, with the greatest risk observed two to four weeks after the floods started. The study found that diarrhoeal diseases are caused by floods via multiple pathways (Wang *et al.* 2023: 1212). The first pathway includes direct associations, which involves the contamination of water sources because of pathogen transport and infrastructure failure (Powers, Mureithi, Mboya, Campolo, Swarthout, Pajka, Null and Pickering 2023: 6981; Alexander, Heaney and Shaman 2018b: 2). Storm water runoff can cause sewage overflow which results in the release of raw or poorly treated wastewater and faecal pathogens into the environment via air, land, water including groundwater, rivers and sea (Sojobi and Zayed 2022: 1).

Suhr and Steinert (2022: 10) examined existing literature to understand how flood exposure had affected the health outcomes within Sub-Saharan African communities. They found that floods in the region have been associated with negative health outcomes. Most of the studies reviewed highlighted an increased risk of contracting illnesses such as cholera, scabies and malaria. However, the review also found a lack

of sufficient research on the long-term health effects, particularly in relation to mental health, chronic diseases, and pregnancy.

The mental health of children has also been affected by floods and other natural disasters. They can cause sleep disorders, regressive behaviours, sadness, animosity, somatization, and negative thinking (Kousky 2016: 73). Lai, La Greca, Colgan, Herge, Chan, Medzhitova, Short and Auslander (2020: 1022) described the impact of natural disasters on children, saying that children under the age of 18 years are hugely vulnerable during natural disasters, and experience challenges not only to their physical health, but also to their mental health after exposure to a disaster. Following a disaster more than 50% of children reported enduring symptoms of post-traumatic stress disorder, including nightmares about the incident, hypervigilance, trouble falling asleep, and trouble focusing on tasks (Lai *et al.* 2020: 1021; Pfefferbaum, Weems, Scott, Nitiéma, Noffsinger, Pfefferbaum, Varma and Chakraborty 2015: 56). Various other studies have also found that children who are exposed to natural disasters experience depression as well as emotional and behavioural reactions such as anxiety being separated from their parents, social withdrawal, decline in interest in activities and reduced academic performance depending on their age (National Center for Disaster Preparedness 2015: 1).

In a qualitative study which explained the factors influencing mental health after flooding events in Germany, Hieronimi, Elbel, Schneider, Wermuth, Schulte-Körne, Nowak and Bose-O'Reilly (2022: 2), reported that physical separation between family members can intensify emotional distress especially amongst children and adolescents and that restoring normality was particularly important to assisting children who were experiencing negative effects. The study found that some of the immediate reactions experienced by children after the flooding were fear, helplessness and anxiety. Several participants observed that even six years after a flooding event, some young people continued to suffer from ongoing anxiety during heavy rains.

A systematic review which explored research over a 40-year period, evaluated the prevalence of post-traumatic stress disorder amongst children and adolescents after earthquakes and floods. It found that girls were more vulnerable and were at risk for

post-traumatic stress disorder (Rezayat, Sahebdel, Jafari, Kabirian, Rahnejat, Farahani, Mosaed and Nour 2020: 1265). There is however limited empirical research on the effects of flooding, on the mental health of children in Sub-Saharan Africa. A study, conducted by Taukeni, Chitiyo, Chitiyo, Asino and Shipena (2016: 1) on post-traumatic stress disorder amongst children aged 8-18 who were impacted by the 2011 floods in Northern Namibia, found that two years after the disaster, more than half of the learners aged 12 and under and almost three-quarters of those aged 13 and older, had continued to experience signs of psychological distress related to the floods.

Beyond the immediate trauma and harm caused by natural disasters, children who have experienced a disaster will also experience challenges with their education. Children's education is often interrupted after a natural disaster due to the closure of schools, as well as limited attendance of children who are affected. For example, following Hurricane Katrina, studies have shown that children experienced school disruption and higher rates of absenteeism (Tian and Guan 2015: 5540; Picou and Marshal 2007: 767). Carrion, Weems and Bradley (2010:667), conducted a study which assessed whether traumatic stress and post-traumatic stress disorder can influence brain development in children, found that exposure to trauma can alter brain anatomy and functioning which can subsequently inhibit learning and memory processing. Other studies by Mudavanhu (2014: 1) on the effect of flood disasters on children's education in the Muzarabani District in Zimbabwe found that poor academic performance was linked to loss of learning, increased absenteeism and the entire syllabus not being covered. The study also identified several factors that increased the school's vulnerability to flood disasters in the area, such as physical landscape, location, changing climatic conditions, absence of building standards, limited finances and a lack of resources (Mudavanhu 2014: 6).

Children that are living in poverty, unstable and temporary housing are also more vulnerable to the effects of flood disasters, as their social contexts increase the possibility of them experiencing the risk factors discussed (Lai *et al.* 2020: 1). Dube and colleagues, found in Zimbabwe, that there was a link between flooding and poverty, as flooding worsens the economic circumstances of individuals, and poverty increases flood vulnerability (Dube *et al.* 2018: 5). Furthermore, some communities

due to their level of poverty are also compelled to reside in areas that are vulnerable to flooding (Dube *et al.* 2018: 6). The effects on families are discussed in the subsection that follows.

2.13 Effects of flooding on families

The family is a fundamental and foundational unit of a society, with family cohesion defined as the emotional bond that exists between family members, that has many positive outcomes on human behaviour (Wang, Foutz and Gao 2022: 1). Natural disasters which impacted families, causing suffering and losses, has underscored the need for greater physical and mental support for those most affected (Sobhaninia 2023: 1).

Family stress can be defined as a disruption to the steady state of a family's system which can result from an external situation, such as a war or a natural disaster or from an internal situation such as death or divorce (Boss, Bryant and Mancini: 2016: 2). Understanding the consequences of natural disasters on families is of paramount importance. Natural disasters have significant negative effects on families, causing financial strain, affecting familial roles and responsibilities which consequently influences the mental and physical well-being of families (Wang *et al.* 2022: 1; Wu, Zhang, Wang and Feng 2022: 9; Zhang, Zhang and Dai 2022: 4; Jia, Li, Lu, Ning, Christakis and Jia 2021: 9).

A growing body of empirical research highlights the multiple effects that natural disasters have on families (Samonte 2021: 250). Ene (2024: 92) conducted a study in the Niger Delta area in Nigeria, on the multifaceted effects of flood disasters. They found that psychological suffering, loss of one's home, disturbance of social networks and financial strain, as well as the disruption of education and healthcare services had contributed to family disorganisation. The consequence of family disorganization has been shown not only to affect the well-being of the family, but also the functionality of society, as reflected in weak academic performance, violent and criminal conduct, addiction to drugs and other morally and criminal behaviour (Ene 2024: 86).

In his study on the impact of natural disasters on rural household wealth, Wu *et al.* (2022: 3) analysed data from the 2014, 2016, and 2018 China Family Panel Survey. The survey included a comprehensive study of individuals, households and communities in twenty-five Provinces in China. The study found that the effect of natural disasters had significantly reduced household wealth, with greater effects on households that were larger and where consumption was higher. The households with higher consumption owned more assets and were more vulnerable to losses from mudslides, hailstorms and typhoons (Wu *et al.* 2022: 10). Further analysis showed that natural disasters affected household wealth in the short term and long term due to the reduced income and lasting damage to residents' health, which led to ongoing loss of income and medical expenses (Wu *et al.* 2022: 11).

In addition to financial hardship, disasters also influenced family spatial dynamics and interpersonal relationships. Wang *et al.* (2022: 1) conducted a statistical analysis of over a billion population records, to measure the scale and dynamics of the shift in family co-location that is families living in close proximity after a disaster. The study found that family cohesion which relied in part on physical proximity is influenced by socioeconomic factors. One of the findings was that lower income families were less likely to co-locate after a disaster, due to their rigid and irregular work schedules, whereas families of higher socioeconomic status were able to stay with families who were in closer geographic proximity, owing to a greater flexibility in their working conditions (Wang *et al.* 2022: 9).

Amidst disaster events, the emotional and functional roles of the family such as the provision of economic support including the supply of necessities such as food, housing and clothing, as well as emotional support such as comfort, love, and socialisation of children are compromised (Yulianto, Yusanta, Utari and Satyawan 2021: 1; Kousky 2016: 73). In a study that aimed to explore how the family functions in the aftermath of a cyclone in Queensland Australia, McDermott and Cobham (2012: 1-4) assessed 145 families with children between the ages of eight and twelve years. They found that 28% of parents had reported a breakdown in family functioning after the disaster. One interesting finding was the relationship between how a child perceives danger and the functioning of the family. The researchers found that there

were higher levels of family dysfunction in the groups where children did not perceive a threat of death, during the cyclone.

A qualitative study conducted by Fernandez, Boehs, Denham, Nitschke and Martini (2017: 8) on the unanticipated changes faced by families in rural areas, following a natural disaster found that the loss of homes, loved ones and unemployment after a disaster had influenced family social interactions, day to day routines and their conservation of cultural standards. The study found that following the death of family members, friends or neighbours, the surviving families were still trying to adapt both physically and emotionally. When families that are affected by disasters lose their belongings including their homes, and possessions they mourned their losses and struggled to acquire same, over the subsequent years (Fernandez *et al.* 2017: 7).

Ajodhia and Makhanya (2024: 13) conducted a qualitative study on displaced African single mothers, who were affected by the 2022 floods in KwaZulu-Natal. They found that these women were overwhelmed and distressed, as they had to face the double burden of coping with the trauma of the floods on their own, as well as look after their children due to the absence or lack of support from their partners. Socially, the relocation of families that is brought on by natural disasters also caused a family to fall apart and for support systems to collapse. Natural disasters affect family mobility and the functioning of the family (Samonte 2021: 250). Families that are displaced can be relocated to places where there are no established support networks such as friends, extended family and community resources thus making it difficult for them to handle the aftermath of the disaster, as the social isolation causes loneliness, helplessness and depression (Gagné 2020: 712). A study by Matsuoka, Haseda, Kanamori, Sato, Amemiya, Ojima, Takagi, Hanazato and Kondo (2023: 6) which was conducted on adults affected by the 2016 Kumamoto earthquakes, found a lower risk of major depressive episodes amongst older adults that were engaged in group activities, when relocated to temporary shelters, as compared to those who did not engage in group activities. This suggests that social interaction mitigates the negative impact of disaster relocations on mental health.

Natural disasters have also resulted in higher levels of violence against women (Karabay, Akhmetova and Durrani 2024: 2; Rai, Sharma and Subramanyam 2021: 16; Thurston *et al.* 2021: 2). A global systematic review conducted by Thurston *et al.* (2021: 2), which analysed the literature regarding violence against women and girls and natural disasters, found positive associations between an increase in violence against women, after various natural disaster events. One study showed that during the heat waves that affected Spain from 2008 to 2016, there was an increase in intimate partner violence, one day after the heat wave and intimate partner femicide which was reported, three days after the disaster (Sanz-Barbero, Linares, Vives-Cases, González, López-Ossorio and Díaz 2018: 1).

Another study conducted by Harville, Taylor, Tesfai, Xiong and Buekens (2011: 2) amongst post-partum women that were affected by Hurricane Katrina, found that there was an increased risk ratio between the damage caused and being disrespected, shouted and sworn at, as well as physical violence like being pushed, punched, kicked and beaten up, which indicated that during and after these stressful times, violence was a part of conflict resolution experienced by women. Similarly, a survey conducted by Rao (2020: 1) in four states in India six years prior to, immediately after and 10 years following the 2004 Indian Ocean tsunami, revealed that there was an increase in intimate partner violence between 2005 and 2015, which was seen across all States, compared to regions that were not affected by the tsunami. There was an increase in physical (61%), sexual (232%) and emotional violence (122%) in some states (Rao 2020: 5). The study also showed that a decade after the tsunami disaster, the association between caste and religion and intimate partner violence had decreased, whilst socio-economic factors had remained significant. This suggested that intermittent partner violence evolves over time following a disaster, as families recover but continue to experience socio-economic challenges (Rao 2020: 8).

Locally, a qualitative study conducted by Jewkes *et al.* (2023: 7) which aimed to describe the gendered impacts of floods on women and men affected by the April 2022 floods in eThekweni, had found that amongst women who had experienced a worsening of intimate partner violence, the loss of masculinity experienced by men

when they lost their jobs and homes and had to seek shelter had influenced the abuse. The effects of flooding on communities are discussed in the sub-section that follows.

2.14 Effects of flooding on communities

Natural disasters have had significant effects on communities (Bathina, Ten Thij and Bollen 2022: 1). They can impact the quality of life, including the material and economic aspects, physical and mental health, and a sense of security (Nakova and Milenkova 2023: 56). In a study that focused on the changes in society following natural disasters, Roslinawati (2021: 493) described the changes in behaviour and socio-economic circumstances of the community, after the 2018 earthquake in Palu City, Malaysia. The study found that there were changes in behaviour, that included high levels of shared help kinship as well changed socio-economic conditions amongst the affected people of Palu City, after the disaster. Socio-economic conditions were affected negatively, as many people experienced loss of their property, due to damaged infrastructure, with the resultant weakening in the social and economic circumstances of the community (Roslinawati 2021: 493).

The interruption of social services, education, and healthcare are just some of the many challenges that flood-affected communities must confront. Infrastructure degradation reduces community resilience which delays and challenges recovery (Ngcamu 2023: 7). Roads, bridges, and public transit networks are often destroyed, which isolates communities and complicates assistance and service delivery (Thoithi *et al.* 2022: 1). This isolation may slow down attempts at rehabilitation and prolong the suffering of impacted populations (Mudefi, 2023: 6). A scoping review conducted by Mudefi (2023: 16) on disaster management activities following the April 2022 KwaZulu-Natal floods, found that extensive damage to property and infrastructure equated to a longer time required for recovery, in terms of resources and time. This was exacerbated particularly where government systems are inefficient and ineffective. Often among the infrastructure destroyed are schools and healthcare institutions, which disrupts education and healthcare services (Mudefi 2023: 15). These are regarded as central pillars for the stability of a community (Hassan and Mahmoud 2021: 1). The lack of access to these services, exacerbates the problems experienced

by flood affected communities and may have long-term effects on their resilience and growth (Hassan and Mahmoud 2021: 1).

Natural disasters can also both positively and negatively affect cohesion within communities (Chang 2010: 289). Individuals, families and communities who are displaced find themselves moved to makeshift shelters or new neighbourhoods where they lack established social links, which are vital for both emotional and pragmatic assistance (Ajodhia and Makhanya 2024: 610). A study conducted by Akbar, Ahmad, Safdar and Yousaf (2024: 6) indicated that disasters are distinguished by their devastating consequences and that due to subsequent evacuation and relocation, the social isolation of community members leads to loneliness, a loss of sense of community and community life as well. The Centre for Disease Control, defined loneliness as the sense of being alone, irrespective of the amount of social contact, a person has and social isolation as a lack of social connections, with social isolation leading to loneliness amongst some people (Centre for Disease Control 2021: 1). In a study conducted by Yuka, Kozo, Kiyomi, Kotaro, Ryohei, Nobuyuki, Mamoru, Atsushi and Makoto (2022: 4343) on the association between being isolated socially and mortality, following the 2011 earthquake and tsunami in Iwate Prefecture, Japan, found that social isolation was prevalent amongst 29.9% of the overall study population, with a higher prevalence of women (26.5%) that were affected as compared to men. The study found that after the earthquake, when over 400 000 people took refuge in evacuation centres, most of the people lost their homes as this caused them to also lose their social ties, resulting in social isolation of the residents in the affected areas.

A report produced by the Queensland Disaster Management Centre in Australia on the various disasters experienced in the district between 2017 and 2022, found that at a household level for vulnerable people, especially the elderly, cultural and linguistic barriers had increased social isolation and vulnerability to disasters such as tsunamis (Queensland Disaster Management 2022: 149). In a systematic review of qualitative studies, Noone and Yang (2022: 1) explored community-based responses to loneliness amongst older people. Their study found three common themes namely, autonomy, new social connections, and belonging. Older people who were given the opportunity to exercise their choice, be heard and valued had reduced feelings of

loneliness. Post disasters, victims found that making new social connections with other people were gratifying and had improved loneliness (Noone *et al.* 2022: 9)

Natural disasters like floods can also bring people together, as people work together to react to and recover from the crisis, thereby fostering a sense of solidarity among community members (Ogie, James, Moore, Dilworth, Amirghasemi and Whittaker 2022: 9). Natural disasters often exacerbate existing social inequalities, affecting vulnerable populations such as the elderly, children, people with incapacities, and financially constrained communities disproportionately (Matlakala *et al.* 2024: 1). These disparities can increase after a disaster, leading to social tensions and resentment (Ntontis, Drury, Amlôt, Rubin and Williams 2020: 6). Poorer communities and poor households take longer to recover after a disaster and often must navigate between catering for essential items and reconstructing their homes (Hallegatte and Walsh 2021: 1).

Communities that are marginalized are also more likely to experience a disproportionate burden of social challenges, after a natural disaster due to the inherent pre-existing inequalities that they suffered prior to the disaster (Mendis *et al.* 2023: 6). A qualitative study conducted by Witting, Barrow, Lambert, Whiting, Hartshorn, Marks, Wickrama and Thanigaseelan (2020: 1222) on widowed women in Sri Lanka who endured the 2004 tsunami, described sexual and gender-based violence, as the most prominent social challenge post disaster in the community with many incidences occurring in the shelter camps. Mendis *et al.* (2023: 8) further documented that post-traumatic stress disorders are one of the most common health challenges faced by marginalized communities after a disaster thereby adversely influencing a community's sense of well-being.

Natural disasters may also harm the economy of communities, because of damages to businesses and homes, infrastructural damage to roads, bridges, electrical and water systems, business closures and disruption to supply chains. A study by Tanoue, Taguchi, Nakata, Watanabe, Fujimori and Hirabayashi (2020: 14) following the 2011 flood in Thailand, found economic losses which amounted to \$14.7 billion, almost 60% of the total direct economic damage. This reduced the gross domestic product of the

country by 4.8% in the same year. After natural disasters, numerous communities experienced significant losses in wealth and infrastructure (Wu *et al.* 2022: 11). The shock and anxiety caused by these occurrences could impact the social conduct both within and outside of the impacted area (Berrebi, Karlinsky and Yonah 2021: 2). Natural disasters also lead to changes in social behaviours, with monetary contributions declining in the affected community after a time.

Berrebi *et al.* (2021: 1) conducted a study on individual and community behavioural responses to natural disasters, using county level administrative data of donations, crime and natural hazards in the United States of America. During the time assessed by the researchers, between 2004 and 2015, there was an excess of 10,000 natural disasters in the United States, which caused thousands of deaths and injuries, as well as billions in dollars of damages (Berrebi *et al.* 2021: 2). The study found that after a natural disaster, the amount of monetary donations had decreased in an affected community. However other communities in the neighbouring areas had increased their charitable donations. Another finding from the study was that the crime rate decreased. This is in keeping with the consensus that criminal activities such as looting is infrequent during and after a disaster, with people behaving pro-socially and aiding each other with rescue, supplies and shelter rather than behaving antisocially (van Brown 2019: 1).

Psychologically, whole communities may experience collective trauma, which results in a higher occurrence of psychological problems and a general deterioration of general community well-being (Bouchard *et al.* 2023: 236). Bouchard *et al.* (2023: 238) argued that disasters like flooding shatters the bonds of communities, routines and familiarity leading to distress and anxiety amongst community members. This finding was reiterated by Munro *et al.* (2017: e138) in their study on communities in England, following extensive flooding during 2013-2014. The study supported the notion that communities that were affected and displaced by the floods, had a higher occurrence of depression, anxiety and post-traumatic stress disorder than communities who were not displaced. Many of the mental health systems which are impacted within communities, are unable to meet the rising demand for services, therefore depriving many people of the necessary help, to recover. This was seen in the review by Rivera,

Belligoni, Arroyo Rodriguez, Chapdelaine, Nannuri and Steen Burgos (2024: 1). The study revealed a lack of mental health amenities in Puerto Rico, that was worsened by natural disasters namely Hurricanes Irma and Maria, 2019 earthquake and the COVID-19 pandemic. Additionally, the rural areas were more affected by the delays and difficulties in accessing mental health care services (Rivera *et al.* 2024: 7).

In the aftermath of a disaster, communities begin the process of healing, mourning their losses, restoring the damaged facilities, and adjusting to their new life together (Maldeniya, De Choudhury, Garcia and Romero 2023: 655). The combined physical, psychological, social and financial effects of floods on communities emphasize the importance of comprehensive disaster response plans (Mudefi 2023: 14; Ngcamu 2023: 6).

2.15 Community recovery

Communities are often faced with significant challenges, when it comes to recovering from the damages and losses caused by a disaster. Recovery is the process of rebuilding public and private infrastructure (Joerin, Steinberger, Krishnamurthy and Scolobig 2018: 643). Alesch, Arendt and Holly (2010: 7) argued that community recovery involves more than restoring a built environment but involves a community developing social and economic processes and relationships. Finucane, Acosta, Wicker and Whipkey (2020: 482) asserted that one of the challenges in disaster recovery is focusing on addressing the short-term needs, without causing new or worsening any long-term needs, that may make the community susceptible within the future.

Elkbuli, Herrera, Awan and Ellassad (2021: 804) described the four phases which are involved in community recovery following a natural disaster namely, mitigation, preparedness, response and recovery. Organizational Resilience (2023 para. 1 line 1-19) detailed these four phases as follows:

- Mitigation refers to the process of decreasing the impact of disasters and reducing the loss of infrastructure and lives. It encompasses all the activities that are undertaken to prevent and reduce the occurrence of emergencies.
- Preparedness entails a process of planning, organising, training, equipping and taking necessary actions to ensure that communities are ready for any disaster.
- The response phase is a reaction to the events that occur during a natural disaster and consists of actions that entails saving lives, infrastructure, reducing losses and decreasing suffering.
- Recovery involves the actions that are undertaken during the disaster and after the disaster, to ensure that communities are restored back to a normal state, that includes the repair of physical, social and economic damages and restoration of basic services.

Masudin and Fernanda (2019: 3) conducted a review after the Indonesian earthquake and tsunami disasters. They discussed that when a disaster occurs the phases of community recovery, namely mitigation, preparedness, response, and recovery, relies on a well-run humanitarian logistics system. Humanitarian logistics involves the ability to identify requirements such as medicines, food and non-food items and engage in fundraising, to ensure the procurement, transportation, storage and distribution of the products and services to the people in need (Moshtari, Altay, Heikkilä and Gonçalves 2021: 1).

2.16 Faith-based organizations

Faith-based organisations, have a long history of humanitarian relief and are important in responding to communities in need of emergency assistance (Khafagy 2020: 1; Ferris, 2005: 311). Research conducted by Ferris (2005: 325), almost a decade ago, explored the role of faith-based organisations and their humanitarian work and observed that these organisations, although embedded in their local communities had a global reach in terms of humanitarian aid. Berger and Kent (2016: 15) defined faith-based organisations, as non-profit, voluntary bodies whose mission is rooted in religious and spiritual beliefs and who are often the first to respond during a crisis. There is a sense of universalism amongst faith-based organisations that enables them

to respond to those affected by disasters irrespective of their caste, creed or religion as all faith-based organisations believe in a sense of charity (Jena and Ranjan 2015: 29).

2.16.1 Role of faith-based organisations during natural disasters

Throughout history, faith-based organisations and places of worship such as churches, temples and mosques have been drawing attention to the welfare of human beings (Clarke and Ware 2015: 40; Mansour and Ezzat 2009: 118). One of the primary aims of faith-based organisations is to distribute relief, based on the humanitarian principles of human dignity, neutrality, objectivity, independence and empowerment (International Committee of the Red Cross (ICRC) 2022: 2).

In a qualitative study that examined the role of faith in the disaster experienced by four communities on the Hawaiian Islands of the United States of America, McGeehan and Baker (2017: 258) found that faith-based organisations are more than just religious organisations. They also work as social networks, that can be used to create and share disaster specific resources within communities. In addition, the study showed that faith-based organisations, have a deep understanding of their community and the trust they establish within these enable them to identify specific requirements of these communities.

Faith-based organisations also provide material support in the aftermath of a disaster. A study conducted by Chida and Chabata (2016: 38) on an International Christian Church in Zimbabwe, to determine the range of humanitarian aid provided, found that the church provided health services, sanitation and food provision. Furthermore, during the 2009 outbreak of cholera, assistance was also provided to non-members of the church as well. The researchers found that the role performed by the church included the functional necessity of maintaining social order and stability within the community.

An analysis of the role played by faith-based organisations during Hurricane Katrina indicated that some of the services provided by faith-based organisations included

rescue missions, reuniting family members, providing shelter, meeting cultural needs, donation management, cleaning up and providing medical services (Phillips and Jenkins 2010: para. 1 line 11). De Vita *et al.* (2008: ii) however opined that faith-based organisations had provided lesser long-term support related to housing, rehabilitation and psychological therapy. Instead, the aid they provided focussed on instant relief such as food, water, clothing and provisional shelter.

Psychosocial and spiritual support is a further critical area of the role of faith-based organisations. Hirono and Blake (2017: 1) undertook an international and cross-cultural mixed method study, that explored the role of the Christian clergy in the United States of America and Buddhist clergy in Tokyo. They found they restored hope following natural disasters and that post disasters the support needed by survivors, included the provision of mental health support to bolster victims' residual power and prevent survivors from developing post-traumatic stress disorder. Similar findings were made by Glass, Flory, Hankin, Kloos and Turecki (2009: 779) and Cherry, Sampson, Galea, Marks, Nezat, Baudoin and Lyon (2017: 68), in their studies of Hurricane Katrina survivors. These studies showed that hope was negatively related to post-traumatic stress disorder symptoms and psychological distress amongst Katrina survivors. Hirono and Blake (2017: 12) also found that across the two cultural organisations, although their approaches were different, with the Christian clergy preferring action and the Buddhist clergy preferring listening, as their mode of action, both sectors have the same goal of maintaining hope amongst survivors.

In a study aimed at exploring the Muhammadiyah theological stand on disasters and the role played by faith-based organisations in coping with disaster management and mitigation, Baidhaw (2015: 184) described four categories of support, namely, medical supporters who worked with hospitals and clinics, psychosocial volunteers and environmental health volunteers. The relief and assistance provisioned are done regardless of religious affiliation (Baidhaw 2015: 190).

Community based trust and cultural familiarity allows faith-based organisations to play a significant role in disaster mitigation and capacity building. Okyere, Abunyewah, Addai, Mensah, Frimpong and Kwang (2024: 11) conducted a study on the role of

faith-based organisations in informal areas in the urban city of Accra during disasters. They established that faith-based organisations are the most common public organisations in Accra and had contributed considerably during disasters, by addressing the gaps left unfulfilled by government departments. Some of the areas that faith-based organisations assist with include cleaning up of the communities, preventing the blockage of gutters, creation of awareness and provision of disaster warnings. Another area that faith-based organisations contributed significantly to, was the provision of religious beliefs messages which were delivered in mosques and churches by providing victims, with interpretations of the hazards they faced and a reminder of the presence of a greater good (Okyere *et al.* 2024: 12). Elliot and Webb (2023:37) explored the role of faith-based congregations in disaster response and found that faith-based organisations understood the areas and the culture of the communities they worked in. They provided services following disasters which included the provision of food, shelter, counselling, coordination of volunteers and donations as well as rebuilding support.

The emerging roles of based organisations also include proactive disaster preparedness. Jena and Ranjan (2015: 33) posited that there was a paradigm shift with regards to the approaches used by faith-based organisations with respect to humanitarian aid. They realised that hazards could not be prevented or eliminated, but that their impact could be minimised. Hence faith-based organisations include proactive approaches which involved pre-disaster preparedness and post-disaster mitigation aspects, including education and training. Baidhawry (2015: 185) stressed the importance of capacity building activities for disaster management, which aimed at improving the competence of those involved with disaster management and resulting in increased trust amongst local governments and the organisations which were capacitated.

Interfaith cooperation during a disaster has also gained prominence. Prianto, Usman, Amri, Nurmandi, Qodir, Jubba and Ilik (2023: 129) described the humanitarian work during the COVID-19 pandemic in Indonesia. Faith-based organisations in Indonesia were unified and encouraged interfaith partnership in the management of the

pandemic, demonstrating the ability to collaborate across non- government sectors and play an important part in responding to the crisis.

2.17 Faith-based organisations in South Africa

In South Africa, flood disasters affect the mental health of individuals and their spiritual well-being (Makwana 2019: 4). Faith-based organisations can provide active support to communities during and after flooding events (Okyere *et al.* 2024: 9). In South Africa, faith-based organisations comprise of 12% of the total number of non-profit organisations (Statistics South Africa 2015: 1). South Africa has a diverse religious and cultural society and these faith-based organisations emerged during the apartheid era, to respond to the poor socioeconomic conditions which were prevalent in communities affected by social disparities (Shunmugam 2024: 3). When there are natural disasters, many faith-based organisations from various affiliations provide relief material and resources beyond their own religious and racial communities (Jahani and Parayandeh 2024: 2). Most of the South African population (80%), follow Christianity, whilst others are adherents of Islam, Hinduism, Traditional African Religion, Judaism and other religious worldviews (Statistics South Africa 2022: 36). Hindu and Muslim faith-based organisations are active in disaster relief and social development programmes across South Africa (Khan, Gabralla and Ebrahim 2013: 713). There are however limited studies that have documented the role played by faith-based organisations in the provision of humanitarian aid during these disasters. In a case study of the Gift of the Givers a Muslim faith-based organisation which responds to disasters, Khan *et al.* (2013: 713) described the vast local and international humanitarian aid provided, by the organization. This consisted of multiple aid projects and disaster relief operations.

Van Straten and Ncube (2023: 1) assessed the spiritual and mental health of people affected by the 2022 KwaZulu-Natal floods. Whilst the study did not explore the role of faith-based organisations during and after the floods, they found that the religious and spiritual areas of mental health were overlooked, when addressing the needs of people affected by floods and that these areas needed to be included in disaster management processes (van Straten and Ncube 2023: 4).

In addition, to faith-based organisations, community workers and social workers provide support during disasters. However, the unique positioning of faith-based organisations which are rooted in their spiritual beliefs, community trust and local knowledge makes them a vital role player during a disaster response. The role of social support networks is discussed next.

2.18 Social support

Social support has been widely recognised as a critical factor during post disaster recovery for affected people and is strongly associated with improved health and well-being (Bui, Anglewicz and Van Landingham 2021: 4). The provision of social support to victims affected by natural disasters can assist them with overcoming the trauma they experienced (Calhoun, Stone, Cobb, Patterson, Danielson and Bendeزú 2022: 949). In a study conducted by Dale and Safren (2018: S25) amongst women, it was found that women sought social support from family members, friends and providers such as case managers, because of the trauma they encounter. The study revealed that the care provided by the case managers included trust, honesty and non-judgmental attitudes with positive regard for women (Dale and Safren 2018: S25). It further revealed that the social support offered by case managers, not only includes linking women to tangible resources such as food, housing and transportation costs but also support for legal queries, thus allowing for resilience and growth amongst the women (Dale and Safren 2018: S24).

The provision of social support has been found to result in numerous positive and protective effects including decreasing the risk attributed to negative psychological effects, such as post-traumatic stress disorder, depression and self-harm and improving treatments outcomes (Li *et al.* 2023: 5; McGuire, Gauthier, Anderson, Hollingsworth, Tracy, Galea and Coffey 2018: 223). A survey conducted by McGuire *et al.* (2018: 228) eighteen to twenty-four months after Hurricane Katrina, amongst adults exposed to the disaster, found that the social support that had been provided had considerably buffered the adverse effects caused by the Hurricane, on depressive symptoms experienced by the victims.

According to the conservation of resources theory, the fundamental cause of stress is the loss of resources including financial, housing, and psychological resources (Hobfoll 2009: 1). The loss of resources following a natural disaster is a key determining factor of negative psychological outcomes, such as post-traumatic stress disorder (Cohen *et al.* 2019: e93). In a study conducted by Cohen, Tamrakar, Lowe, Sampson, Ettman, Kilpatrick, Linas, Ruggiero and Galea (2019: e98) on enhanced social services and the prevalence of post-traumatic stress disorder among financially disadvantaged people after a disaster event, showed that in the first two years after the event, a social services case management approach, that included re-establishing housing and linking victims to mental health services, was linked with better recovery from post-traumatic stress disorder than approaches that did not include a social service case management approach.

A qualitative study conducted by Dickson, Louis and Jabulani (2022: 4), explored the roles that social workers played in disaster risk management in Zimbabwe. They found that social workers played the role of counsellors providing and offering counselling and psychosocial support to affected populations, in the aftermath of a natural disaster. The study also found that social workers collaborated with many stakeholders involved in disaster response, such as government departments and non-governmental organisations, to meet the needs of affected populations and connect them to resources such as food, school fees, and medication. Mhlanga, Muzingili and Mpambela (2019: 4) conducted a study in Zimbabwe found that social workers provided psychosocial support including needs assessments, counselling and referrals to stakeholders after a disaster.

The study found that the role of social workers was greater, following a disaster. Natural disasters often impact service provision, limiting access to fundamental services including health, education, food, water, and sanitation (Lee *et al.* 2020: 3). This exposes vulnerable individuals to injustice and social workers have a crucial role to play in addressing these injustices (Matlakala, Makhubele and Nyahunda 2022: 5).

Social support has also been shown to have an impact on mental health after a disaster. This is particularly amongst survivors and is regarded as one of the pillars of

psychological rehabilitation (Guilaran, de Terte, Kaniasty and Stephens 2018: 344). Following a disaster, the fundamental responsibilities and tasks of the social work profession, which prioritise a people centred, rights-based approach, becomes even more important (Tuncer, Kavgaoglu, Anilgan and Akinlar 2024: 1). The effect of natural disasters in affected communities depends not only on the intensity of the disaster, but also on the type and nature of the community affected and the magnitude of loss and displacement (Hettige and Haige 2016: 595).

A study conducted by Chakrabarti, Naoaj, Yang, Zhang and Chen (2023: 1) on the impact of natural disasters on economic growth in developed and developing countries, revealed that undeveloped and developing countries, were more vulnerable to natural disasters. The effects of natural disasters in these countries resulted in greater societal problems, inequities, inequality, poverty, migration, displacement, the abuse of human rights, and conflicts. In addition, Iqbal and Sheikh (2023: 1) in their study on post-traumatic stress disorder and psychological problems among the victims affected by the devastating earthquake that struck Turkey and Syria in February 2023, found that the effect of natural disasters on vulnerable communities is related to increased social problems experienced by these communities. This ranged from poverty to a lack of housing. As a result of the poverty and high unemployment rates these communities became homeless following a natural disaster and were dependent on the government for support and assistance. Social workers are well placed to support communities and individuals and address the challenges posed by natural disasters, as their primary function, is to protect and improve the well-being of those affected (Tuncer *et al.* 2024:12).

The presence of a close and stable network of family, friends, and community emerges as the foremost determinant in ascertaining an individual's potential for successful recovery from a crisis (Bakic and Ajdukovic 2021: 12). Shevellar and Westoby (2014: 26) explored the roles and practices of community development workers in disaster recovery. They described how citizens came together in times of crises and utilized their collective power to make changes that affect them. They found that the grouping of people during times of need happened naturally, within their existing networks or they were brought purposefully together by community workers. The study found that

roles of community development included supporter, network builder, infrastructure builder, cultural development worker and educator. Other literature also suggests that community development workers play a crucial role in uniting individuals during times of crisis. They assist in identifying and addressing common concerns and necessities, while also guiding individuals towards available resources. This, consequently, enhances the ability of communities to tackle local concerns and actively collaborate with governmental bodies and businesses to effect constructive changes (Gilchrist and Taylor 2016: 1; Caniglia and Trotman 2011: 8; and Toomey 2009: 181).

A case study conducted by Hay and Pascoe (2022: 5) focused on observations made by social workers who worked during disaster management events. One participant described how affected people were often confused by disaster workers, due to a lack of coordination and communication. Communities however are resilient and work together in times of need, to look after one another. This was evident in the way people and volunteer organisations open their homes providing food and shelter to victims. Another participant discussed how people felt isolated and were at risk of withdrawing from social networks and support services, causing them to focus further on their loss. This further cemented the notion of the importance of robust community ties and the upkeep of relationships, all whilst ensuring that support services remain accessible and visible.

In a similar study, Hay, Pascoe and McCafferty (2021: 22) found that communities and families had united to support one another in times of struggle and that community collaboration continued post disaster as neighbours built stronger bonds and supported access to resources of care. The study further found that there were many people who found it difficult to cope, while others were able to demonstrate adeptness and resilience in effectively handling their own circumstances.

2.19 Conclusion

This chapter presented a synthesis of literature related to natural disasters with specific attention to flooding events. This chapter started by providing an overview of natural disasters and then detailed specific factors that influenced vulnerability of

people to natural disasters. This review then proceeded to explore how flooding events affected the health and well-being of individuals, families and communities both in South Africa and abroad. The role of faith-based organisations, social workers and community development workers was then reviewed. Chapter 3 which follows, will describe the research methodology used to guide the study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter the research process and methodology employed in this study including the research philosophy, design, research approach, sample, sampling strategy and data collection method is presented. The role of the researcher and reflexivity as well as the data analysis approach and the procedures used to ensure trustworthiness are discussed. The chapter concludes with the description of the expert validation committee and ethical considerations.

The sub-section that follows provides a discussion of the research methodology used in the study. The study sought to explore the physical and psychological consequences that the 2022 floods had on individuals, families, and communities in eThekweni, in Kwa-Zulu Natal.

3.2 Research Design

A research design serves as the blueprint for conducting a study, providing a framework that guides the collection, measurement, and analysis of data. The research design also refers to the complete strategy that the researcher chooses to assimilate the various components of the study manner, in a way that is “coherent and logical” (De Vaus 2001, cited in Thakur 2021: 1). Fundamentally, a research design depicts the research intention that is required for the researcher to choose a specific approach to the research (Creswell and Creswell 2018: 259). A research design is beneficial as it is a process implemented by the researcher prior to the collection and analysis of data, so as to obtain the objective of the research in a valid manner (Asenabhai, Busula and Ronoh 2019: 77). Hence the research design formulates what data is needed, what methods will be used to collect the data and analyse the data (Asenabhai *et al.* 2019: 78). Following the selection of the research approach, the researcher needs to determine and select the research design for that approach (Creswell 2023:12).

Within the field of social sciences, researchers have a range of study designs available, each appropriate for a distinct type of investigation and goal. Considering the type of data required, research can be classified into quantitative, qualitative and mixed-method approaches (Taherdoost 2022: 54). Quantitative designs such as experimental and quasi experimental approaches focus on testing hypotheses and demonstrating causal correlations (Mohajan 2020: 52). This method uses numerical data obtained from observations to explain the phenomena and to address the research questions in a quantifiable manner (Ghanad 2023: 3794). Additionally, non-numeric data can be obtained in a numerical format, through the use of specifically designed tools (Ghanad 2023: 3795; Taherdoost 2022: 54). Conversely, qualitative research methods aim to answer the scientific and practical issues in society and include naturalistic and interpretative approaches to various questions and subjects (Taherdoost 2022: 54). Mixed-method methods use a combination of quantitative and qualitative approaches as per the purpose and research questions that the study aims to answer (Taherdoost 2022: 55).

3.3 Qualitative research method

Qualitative research has become an essential tool in research studies as they allow researchers to gain rich insights and explore complex approaches that have become essential for gaining rich insights and exploring complex matters in depth (Lim 2025: 1). Qualitative research serves as a method for investigating and understanding the meaning that individuals or groups attach to a social problem (Creswell and Creswell 2018: 51). Furthermore, Lim (2025: 2) contends that rather than quantifying the events, qualitative research aims to understand the “what,” “why,” “when,” “where,” “who,” and “how” of a phenomenon or context by using open-ended questions that cannot easily be documented as numbers (Cleland 2017: 61). Tenny, Brannan and Brannan (2022: 1) asserted that qualitative research allows participants to share what they had experienced, what they think and feel and explain themselves for the event under investigation. This can assist with enhancing an understanding of the data obtained from quantitative analysis studies.

Cropley (2022: 17) indicated that the central principle of qualitative research is that “reality is subjective” where individuals understand that the world based on their specific interactions with it. The Thomas theorem in sociology, designated by William Thomas in 1928, summarized this concept “if men define situations as real, they are real in their consequences” (Thomas and Thomas 1928 cited in Bornmann and Marx 2020: 554), which suggests that if individuals regard something as actual and real, it should be seen as real as they are affected by it (Cropley 2022: 17). Cropley (2022: 59) further emphasized that the researcher and the participants jointly contribute to reconstructing the participants' understanding of the world.

Therefore, this method is useful to understanding the views, behaviours, opinions and motivation of people (Oranga and Matere 2023: 2; Tenny *et al.* 2022: 1) as well as intangible factors like socio-economic status and role of gender and cultural norms (Cleland 2017: 62). The non-numerical data gathered can be used to reveal intricate information about a phenomenon or to initiate new research ideas (Ugwu and Eze 2023: 20). As a result, qualitative research offers a distinct lens to explore and understand the intricacies of social phenomena (Lim 2024: 2).

Leedy and Ormrod (2015: 271) elaborated that the potential benefits of a qualitative research approach are as follows:

- Exploration: it can be useful for gaining a deeper understanding of underexplored topics;
- Multifaceted description: qualitative studies can show the multifaceted nature of situations, systems, processes or individuals.
- Verification: this allows the researcher to assess the validity of assumptions, theories or generalizations in a real setting;
- Theory development: a new theoretical idea or framework related to a phenomenon can be generated;
- Problem identification: key issues or challenges that exist for a given phenomenon can be identified; and
- Evaluation: insights into evaluating the effectiveness of practices, policies and innovations can be developed.

A qualitative research approach was deemed most suitable for the current study. In particular, it was selected to look at how the 2022 floods in KwaZulu-Natal, had affected individuals, families, and communities in the eThekweni District. This methodology was appropriate to the aim of the study, which related to gathering rich insights into the experiences of flood victims and their families and how formal, informal and faith-based organisations collaborated to assist them through the crisis.

A qualitative research approach was best suited for this study for multiple reasons. Firstly, it is an appropriate approach to gather the rich and nuanced experiences of those who were emerging from a natural catastrophe. Qualitative approaches allow for a deeper exploration of the subjective meanings, feelings, and perceptions of individuals transitioning through any difficult experience. Secondly, because this particular natural disaster, has not received scholarly attention, in the South African context, qualitative research formed a pathway to distil rich, contextual data through which new insights could be discovered.

The versatility of the qualitative design is also advantageous. Jamieson, Govaart and Pownall (2023: e12735) highlighted, that qualitative research techniques allow researchers to modify their strategies as fresh data surfaces throughout the study process. Moreover, qualitative research is best for exploring events about which little is known or when current information may be insufficient (Campbell, Greenwood, Prior, Shearer, Walkem, Young, Bywaters and Walker 2020: 653). Regarding the 2022 floods, while the emotional effects of natural catastrophes are well known, the setting of eThekweni and the intersection of many socioeconomic contextual factors provided a unique landscape for understanding the individual, family and community dynamics related to same.

The qualitative approach further allowed for the voices from faith-based organisations to be heard. This together with the voices of flood victims from three regions (urban, semi-rural, and informal settlements), provided a collective understanding of how individuals, families and communities experienced and were affected by the floods. This multifaceted approach captured how different communities were affected and how formal and informal networks, rallied around to help those in flood devastated

areas. In the study of human phenomena, qualitative researchers use diverse approaches of inquiry, instead of relying on statistical methods (Ugwu and Eze 2023: 20). There are five primary methods underpinning qualitative research. These include grounded theory, ethnography, phenomenology, narrative research and case study (Oranga and Matere 2023: 3; Kandel 2020: 658; Leedy and Ormrod 2015: 271). Despite the differences inherent within these approaches, they all focus on capturing the richness of people's experiences (Ugwu and Eze 2023: 20). The research design selected, for the current study, was an instrumental case study design. The rationale for this choice is presented in the sub-section that follows.

3.3. 1 Research Approach: Instrumental case study

A case study approach is widely utilized in social qualitative science, psychology and anthropology research (Priya 2021: 1). Schoch (2020: 245) defined a case study approach, as an observed inquiry which seeks to explore a phenomenon in a real-world scenario. Case studies are not methodologically limited and entail a wide range of data collection methods, such as interviews, document analysis, observations and data analysis processes (Rule and John 2024: 2). Coombs (2022: 2) emphasized that whilst a case study, is not the only method it can establish in-depth awareness of a particular issue. Miles (2015: 316) further described that case study methodologies are valuable for educational research and for providing knowledge regarding experiences. There are three types of case studies, namely single, multiple and intrinsic case studies (Coombs 2022: 2). With a single case, the researcher explores a particular phenomenon or issue and selects one specific case to demonstrate and explore that issue (Creswell and Poth 2018: 155). In a multiple case study, the researcher selects several cases to emphasize a single issue or concern (Creswell and Poth 2018: 155). In a case study, the emphasis is placed on the case itself, as it presents a unique situation. This approach is similar to narrative research but retains the analytical methods of a case study (Creswell and Poth 2018: 155). Alternatively, with a case study the researcher places emphasis on the actual case, as it presents a unique situation (Creswell and Poth 2018: 155).

Yin 2014 (cited in Priya 2021: 2) asserted that a case study can be descriptive, explanatory or exploratory in nature, saying that each approach can be structured around either a single case or multiple cases. In a descriptive case study, the aim is to describe an experience in its real-world setting, whereas with an explanatory case study, the aim is to elucidate 'why' and 'how' particular events unfold in a specific way (Priya 2021: 3). The aim of an exploratory case study is to study the phenomenon to determine new research questions that can be studied in greater detail for future studies (Priya 2021: 3).

In contrast to Yin, Stake 1995 (cited in Sibald, Paciocco, Fournie, Van Asseldonk, and Scurr 2021: 294) believed that a research process cannot be planned completely in advance, due to its evolving nature. A researcher can modify the research design even after data collection has commenced. Tomaszewski, Zarestky and Gonzalez (2020: 2) indicated that the key criteria is the bounded system and as such any research situation where the bounded system is central, can become a case study.

3.3.1.1 Defining the case

The eThekweni metropolitan was selected as the instrumental case for the current study. The metropolitan is one of eleven districts in the Province of KwaZulu-Natal (Mpontshane and Holtzhausen 2024: 1) and is the third largest metropolitan in South Africa, with a population of over 3.4 million people (Carbonell, Hofmann, Srikiissoon, Campos, Mbatha, Lakhanpaul, Mabeer, Steenmans and Parikh 2023: 2). It spans an area of approximately 2 555 kilometres extending from the uTongathi river in the north to the aMahlomgwa river in the south (Olanrewaju and Reddy 2022: 3) and a topography that is characterized by steep hills, river valleys, ravines and gorges (South Africa, Department of Cooperative Governance and Traditional Affairs 2021: 5). eThekweni is surrounded by the Indian Ocean to the East and three district municipalities, Ugu to the South, iLembe to the North and uMgungundlovu to the West (South Africa, Department of Cooperative Governance and Traditional Affairs 2021: 5). These clear boundaries of the case are characteristic of the instrumental case study, as the district being studied was bound within these parameters.



Figure 3.1: Location of eThekweni in KwaZulu-Natal, South Africa

Source: (South Africa, Department of Cooperative Governance and Traditional Affairs 2021: 5).

As eThekweni is along the south-eastern coastline of South Africa, it is vulnerable to storms events. There are 18 major river catchments and 4000 kilometres of rivers in the metropolitan. Additionally, the city is in a low-lying area, in the catchment of steep slopes with the uMgeni river in close proximity, thereby increasing the vulnerability of the area to flooding (McLean, Ground, Boon, Roberts, Govender, McInnes, Botes, Allan and Ivins 2016: 16).

eThekweni has a young population, one third of which are minors under the age of 15 years. Sixty-three percent are under the age of 35 years (Statistics South Africa 2011). Moreover, over 8802 households are headed by children and young adults between the ages of 15 and 19 years, while women headed households account for 42% of the population (South Africa, Department of Cooperative Governance and Traditional Affairs 2021: 5).

eThekweni comprises of both urban, semi-rural and rural areas (Khumalo and Sibanda 2019: 6; Sutherland *et al.* 2015: 492). According to the 2016 Community Survey, 81% of the population in eThekweni lived in formal dwellings and 13% lived in informal dwellings or shacks (Statistics South Africa 2016: 59). eThekweni municipality was

selected as the instrumental case for this study, within which the physical and psychosocial effects of the floods on individuals and families could be explored. Within eThekweni, three different case study areas were chosen, to represent the various settlement types. The three areas selected was Tongaat which represented a semi-rural area, Lamontville which represented an urban area and Crossmoor which was an informal settlement. These areas were chosen to capture the experiences of individuals, and families and the impact of the flooding on these communities.

The sub-section that follows, details each of the three case study areas. Lamontville is a suburb south of eThekweni on the Umlaas river and is classified as an urban area and has a population of 32 421 people (Statistics South Africa 2011). The population of Lamontville consists of 32 421 people (Statistics South Africa 2024). This area was developed specifically for the middle class and people working in the industries in the neighbouring suburbs (Bhengu 2013: 15). The housing developments in Lamontville comprise primarily of Reconstruction and Development houses, old cottages and flats (KwaZulu-Natal, Department of Cooperative Governance and Traditional Affairs 2018: 58). The area is also characterized by high levels of unemployment, violence, drug abuse and infrastructural challenges including water, sanitation and electricity (Mottiar 2024:193).

Tongaat is a semi-rural township located north of eThekweni and has a population of 37 000 people. The area is characterised by houses, flats and low-income settlements which house disadvantaged communities, where most people who live here, work as domestic workers and gardeners. There is a high prevalence of socio-economic distress, as the clothing factories that are a source of employment for this community, retrench workers at times and shut down (KwaZulu-Natal, Department of Cooperative Governance and Traditional Affairs 2018: 55). Tongaat is known for its urban potential development prospects and is home to the largest sugar producing mill in Africa. The area is also accessible to people living in the surrounding rural areas, due to the convenient road and rail transport that connects the rural and semi-rural areas to the Durban city and the harbour (eThekweni municipality cited in Khumalo and Sibanda 2019: 4)

Crossmoor is a suburb located within the Chatsworth area, south of eThekweni with a population of 10786 people (Statistics South Africa 2011). Crossmoor is home to three informal settlements namely, Ekupheleni informal settlement; Crossmoor informal settlement and Bottlebrush informal settlement. The formal areas comprise of detached and semi-detached houses, that were built by the Durban Council from 1970s (Brown University 2024: 3). In this study the case centres around the Crossmoor informal settlement which consists of a mix of shack and tent dwellings, that house people from lower socio-economic groups (Brown University 2024: 6). Although unemployment is a challenge in the area, informal businesses such as spaza shops, salons and tuckshops have grown and prospered here since 1994 (Brown University 2024: 13).

eThekweni was selected as the instrumental case due to its high vulnerability to flooding (Thoithi *et al.* 2022: 78) and due to the wide range of settlement types. The researcher resides in eThekweni, and over the last two decades has witnessed an increase in flooding events in the city, that has continued to batter communities, the most recent being the Easter 2019 floods, that resulted in 70 deaths and widespread devastation. The April 2022 floods however impacted eThekweni most severely, causing the largest number of deaths, displacements and infrastructural damage.

The three different areas chosen within eThekweni for this study also represented different social, economic and infrastructural realities. The urban areas as represented by Lamontville generally have better infrastructure and formal housing, in comparison to semi-rural areas represented by Tongaat, which consists of a mix of formal and informal development. Informal settlements lack proper housing and drainage making residents more vulnerable to flooding events.

Faith-based organisations in eThekweni also played an important role in the disaster response and recovery following the April 2022 floods (Mudefi 2023: 16). The three faith-based organisations included a Christian, Hindu and Muslim faith-based organisation, which were included in the study, to understand their responses to the disaster. Figure 3.2 illustrates the eThekweni district as the instrumental case with study sites and participants.

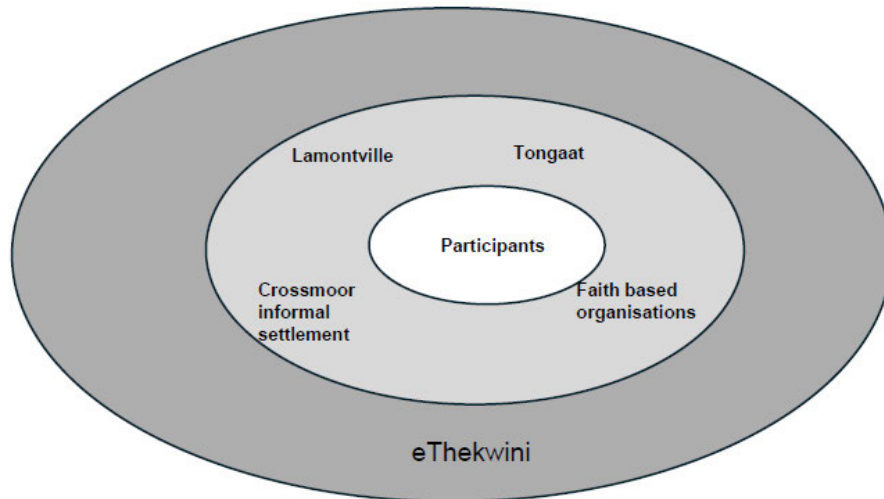


Figure 3.2 Diagram of eThekweni district as the instrumental case with study sites and participants

Source: (Researcher's own creation)

3.4 Research Paradigm

A paradigm represents a specific way of viewing phenomena that involves a set of theoretical expectations that guides the approach to the research (Gray, Grove and Sutherland 2017: 1075). A paradigm encompasses several elements that are categorized as follows: ontology (nature of reality), epistemology (knowledge), axiology (the role of values in inquiry) and method (research design and methods). (Alharahsheh and Pius 2020:40; Kivunja and Kiyuni 2017: 27-28; Saunders, Thornhill and Lewis 2009: 136).

Yong, Husin and Kamarudin (2021: 5858) classified research paradigms into three philosophically distinct categories namely, positivism, constructivism or interpretivism and critical theory. When selecting a research approach, the researcher considered three main areas namely the philosophical view such as post positivist and constructivist; the design approach such as quantitative, qualitative or mixed and the methods of data collection used (Creswell and Creswell 2018: 53). Busetto, Wick and Gumbinger (2020: 2) asserted that qualitative methods commonly use a different approach to quantitative research, that includes constructivism or interpretivism as

opposed to positivism which is used more often with quantitative research (Mwita 2022a: 3). Tomaszewski *et al.* (2020: 1) further asserted that qualitative research aims to understand a research topic, instead of predicting outcomes by using paradigms such as interpretivist and constructivist paradigms. Constructivism views knowledge as knowledge constructed by people, endeavouring to make sense of their experience (Creswell and Poth 2018: 60). Interpretivism aims to enhance knowledge from individuals' unique points of view, through understanding their viewpoints and the meaning the individuals attach to those viewpoints (Creswell and Poth 2018: 59). In this study the interpretivist research paradigm, was adopted to guide the study.

3.4.1 Interpretivism

Interpretivism is a research paradigm that is used in qualitative research. It allows the researcher to investigate and understand human behaviour, interactions and society with the goal of gaining a greater understanding of an individual's reality (Pulla and Carter 2018: 9). Interpretative research does not focus on isolating and measuring variables but rather focuses on gaining an empathic understanding of individual's feelings. Interpretivism is well suited for this study as it considers the various conditions that participants were placed in, as well as the past events that contributed to the development of their social reality (Alharahsheh and Pius 2020: 41). Frechette, Bitzas, Aubry, Kilpatrick and Lavoie-Tremblay (2020: 1) further asserted that the key principle of interpretivist research is understanding the multiple perspectives of a phenomenon that is lived, felt and experienced. By pursuing the experiences of participants in a specific social environment, the interpretivist paradigm allows researchers to gain further information regarding a particular situation (Alharahsheh and Pius 2020: 39). Interpretivists believe that this depth of understanding of humanity will be lost, if the complexity is reduced to a set of generalizations (Saunders *et al.* 2009: 149).

With interpretivist researchers, this complexity is taken into consideration by gathering information that is meaningful to the study participants. Using the interpretivist research philosophy, described by Saunders *et al.* (2009: 148) the details of the

interpretivist research philosophy, related to ontology, epistemology, axiology and the methods used within the current study are described in Table 3.1 below.

Table 3.1: Interpretivist research philosophy

Element	Description in Qualitative Research	Research Context
Ontology	Relativism: Reality is subjective and socially constructed. Individuals perceive and interpret the world differently based on their experiences and context.	The physical and psychosocial effects of flooding is experienced differently by people. Experiences of loss, trauma, and recovery are subjective and vary according to personal, familial, or community contexts.
Epistemology	Subjective Knowledge: Knowledge is co-constructed between the researcher and participants. Understanding emerges from the lived experiences of individuals and is interpreted within specific contexts.	The researcher seeks to understand how individuals, families, and communities make sense of their experiences of a flood. This includes exploring emotions, coping mechanisms or narratives of resilience through interviews.
Axiology	Value-laden: The researcher acknowledges that their values, perspectives, and interactions influence the research process. Reflexivity is central to	The researcher recognizes that his/her values and perspectives influence how they interpret the emotional, social, and physical effects of flooding. They are transparent about these influences and work to build

	understanding the researcher's role.	rapport with participants to understand their experiences.
Methods	Qualitative Methods: In-depth interviews are used to explore the meaning and experiences of individuals. Data is typically analyzed through thematic analysis, narrative analysis, or grounded theory.	The researcher used interviews, to explore individuals' experiences of flooding. Themes are identified based on participants' descriptions and experiences.

Source: Saunders *et al.* 2009: 141

The interpretivist approach was therefore seen as the most appropriate approach, to understanding the experiences of flood victims in a multi-dimensional way. Those affected would have lived through and experienced the effects of the floods on a physical, psychological and social level. The interpretivist approach enables researchers to investigate human experiences in a holistic manner, by considering daily aspects of life such as health, housing, culture, relationships and environmental issues (Pulla and Carter 2018: 9), all of which intersect with the experiences of a flood. Empathy is essential to interpretivist philosophy and allows the researcher to enter into the participant's lived world and understand the world, through their point of view (Saunders *et al.* 2009: 141). Hence the interpretivist approach was relevant in the study of the physical and psychosocial effects of flooding on individuals, families and communities.

3.5 Researcher's role and reflexivity

The notion of reflexivity is essential to qualitative research methodology (Ide and Beddoe 2024: 725). Sirris, Espedal, Jelstad Løvaas and Wæraas (2023: 205) argued that reflexivity is an indication of the quality of the research process, as it enables the transparency of the researcher in terms of his impact on the research. Olmos-Vega,

Stalmeijer, Varpio and Kahlke (2023: 241) defined reflexivity as a “set of continuous, collaborative, and multifaceted practices through which researchers self-consciously critique, appraise, and evaluate how their subjectivity and context influence the research processes.”

Reflexivity can be practiced through three key self-reflective activities: (1) examining one's own thought processes; (2) paying attention to emotions, thoughts, role boundaries, and power dynamics within the research relationship; and (3) reflecting on perceptual experiences (Ide and Beddoe 2024: 726). Implementing these types and purposes of reflexivity, calls for preparation and practical methods (Olmos-Vega *et al.* 2023: 245).

Burnam (2023: para. 5 line 1) described the reflexive practice process as that which involves the researcher examining and recognising his viewpoint. This includes the values, beliefs, and biases brought into the study, his personal background, such as education, race, gender, and political or professional affiliations, prior knowledge before the start of the study, along with the knowledge gained during the research process, what the researcher stands to gain from the study and the perspectives and backgrounds of the participants and stakeholders involved in the research. This is illustrated in Figure 3.3 below.

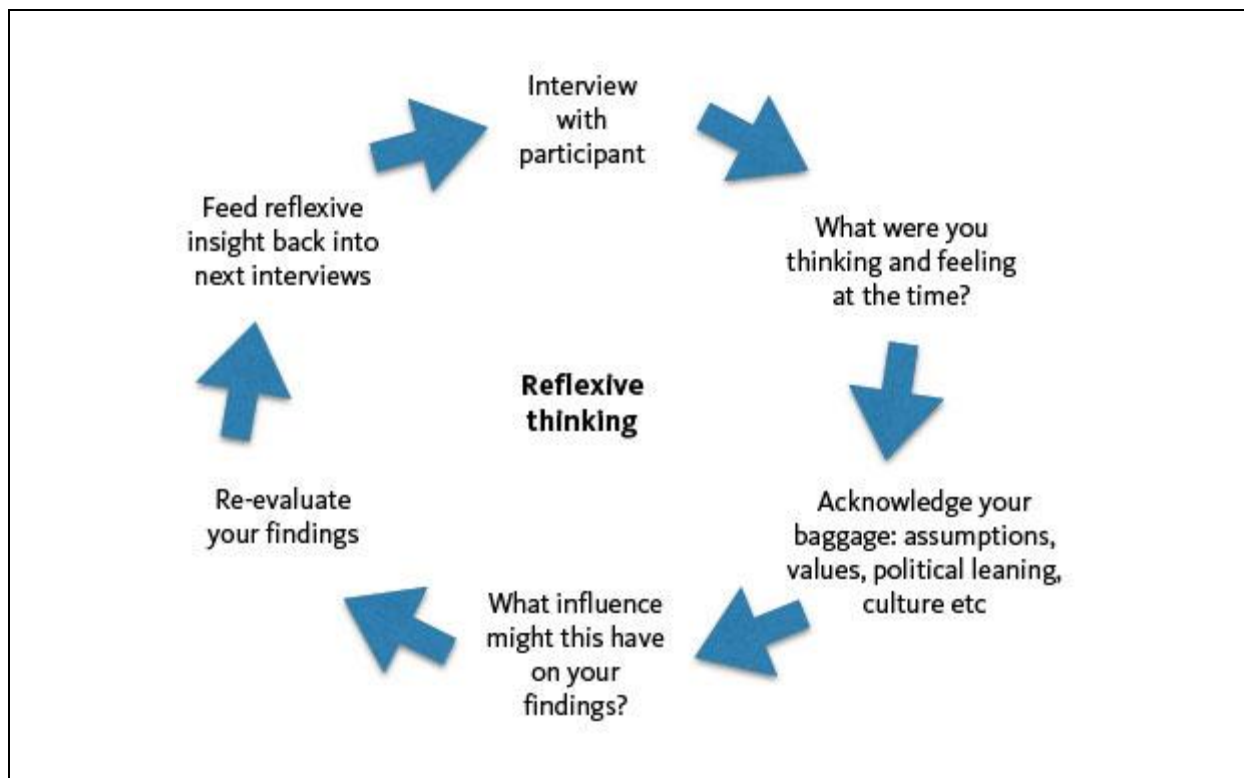


Figure 3.3 The reflexive thinking process
(Source: Boscoe 2023 cited in Burnham 2023: para. 7 line 1)

Reflexivity is important within qualitative research studies, as it allows the researcher to contemplate on his assumptions, belief systems and discernment and reflect on how these can affect the research process (Jamieson *et al.* 2023: 1). It is, however, also essential to consider potentially negative impacts. This includes discussing loss and grief with participants, which may trigger intense emotions for researchers who share those experiences (Olmos-Vega *et al.* 2023: 244).

In qualitative research, the researcher plays a critical role as the primary instrument for data collection and analysis. The relationship between the researcher and the study participants is inherently dynamic, influencing the data and interpretations. The researcher has a background in health sciences, thereby positioning him to understand the physical, psychological and social impacts, as part of a holistic lens through which health is defined and understood. During the interview process, the researcher ensured that he did allow his views and perspectives to influence the narratives of participants. He remained neutral and empathic allowing the flood victims and faith leaders to tell their stories. The researcher also kept a journal which allowed him to record his thoughts and feelings during the research process particularly data

gathering and during the data analysis. The researcher included in his journal his thoughts and experiences in relation to the data collection process and data. He was aware of his subjectivity and made note of when he felt he was biased. The researcher also made notes on aspects, that he recognized as bias, and revisited these journal entries throughout the coding and data analysis process so as to identify the areas where personal views could distort the emerging theme. Additionally, due to the nature of the disaster and the researcher having experienced firsthand the effects of the flood disaster himself, the researcher used mindfulness techniques during the coding sessions in order to be more attentive to the data rather than prior experience. This researcher endeavoured to maintain a logical standpoint that prioritised the data from the transcripts rather than any pre-formulated explanations. These measures supported a structured engagement with the data and helped ensure that the voices of the participants guided the development of the themes.

3.6 Study Setting

An important component of a research study is the study setting as it can influence the research study (Majid 2018: 4). In qualitative research, the focus is on obtaining the perspectives of participants, within their local context (Flick 2024: 14). Given (2008: 787) described the research setting, as the physical, social and cultural area within which the researcher conducts the study.

The aim of this study was to explore the physical and psychosocial effects that the floods had on individuals, families and communities living in the eThekweni District in the Province of KwaZulu-Natal of South Africa. The study was conducted at research sites that all fell within the 'case' area of eThekweni district. The inquiry was not confined to one geographical area, but included three different areas, so as to ensure that the data collected was representative of the people affected. The three areas selected for the study included an urban area and a semi-rural area. Informal settlements which are also characteristic of this region, were also affected by the floods. Hence a further area, which included an informal settlement was included in the study area. The areas selected reflected the various socio-economic groups located in eThekweni. The areas include Lamontville (urban area); Tongaat (semi-rural area) and Crossmoor informal settlement (informal settlement). The inquiry also

included a second sample of faith leaders from three different faith-based organizations, who worked in the eThekweni area.

The samples used in the current study, are described in the sub-section that follows.

3.7 Research population

A research population refers to a broad group of individuals, who share common characteristics within a particular setting and which allow researchers an understanding of the demographic content they intend to study (Willie 2024: 75). The population for a study includes individuals, groups or organizations that the researcher aims to understand and to which the research findings may be applied or generalized (Casteel and Bridier 2021: 343). Establishing a research population assists to establish the boundaries, of the study and offers insight into the context of specific areas (Hossan, Dato'Mansor and Jaharuddin 2023: 4).

The research population for the current study included the women and men that lived in the three study sites at the time of the April 2022 floods, namely Lamontville, Tongaat and Crossmoor informal settlement. The second population were members and or leaders of three faith-based organizations, namely a Christian faith-based organisation, a Hindu faith-based organisation and a Muslim faith-based organisation, which provided humanitarian support at the time of April 2022 floods. Population sizes are reflected in Table 3.2 and Table 3.3 below.

Table 3.2 Population One: Community members

Study sites	Number
Lamontville	32421
Tongaat	37000
Crossmoor informal settlement	10786

Table 3.3: Population Two: Faith based members

Study sites	Number of faith-based members
Christian faith-based organization	251
Hindu faith-based organisation	5009
Muslim faith-based organisation	18

3.8 Research samples

There were two samples in this study. In this section a ‘sample’ is defined. The sampling strategy used, to recruit participants for both samples, is discussed. The inclusion and exclusion criteria for selecting the participants, from both samples, is also described.

3.8.1 Definition of Sample

A sample refers to a portion of the population of interest in a research study (Turner 2020: 1). As the study of an entire research population may not always be feasible, a smaller group is studied. Although when conducting research, the sample size should be representative of the target population, generalizability is not always important in qualitative studies (Elfil and Nigida 2017: 1). The benefit of sampling includes cost effectiveness, being able to obtain information concerning the characteristics of the larger population, less space and time to implement the study. Hence the benefits outweigh the disadvantages of sampling which is the chance of bias (Bhardwaj 2019: 158).

There are two types of sampling strategies, namely, probability and nonprobability sampling. The strategy employed by a researcher in a research study depends not only on the research question, but also on the type of the population of interest, its desired power and significance (Majid 2018: 3). With probability sampling there is a known possibility that each person in the population could be selected in the sample. With probability sampling the entire population is seen as a homogenous group and all members in the population are the target audience of the research (Bhardwaj 2019: 158). Randomised selection is often used to select elements with probability sampling

(Turner 2020: 8). However, with nonprobability sampling there is no known possibility that each person in the population, will be selected within the sample (Bhardwaj 2019: 161). This sampling method is useful in qualitative studies for gathering information for exploratory purposes (Turner 2020: 9) and was adopted within the current study.

As such the sampling technique strategy used in this study, was nonprobability sampling. This strategy allowed the researcher to select participants based on who had experienced the flood event and based on their free will to participate (Golza, Noor and Tajik 2022: 2). Given that the researcher did not have access to the entire population participants were selected based on their location (living in an area affected by the floods). There are two types of non-probability sampling, namely convenience sampling, where the researcher selects participants that are available and willing to participant, and purposive sampling where the researcher selects participants according to a specific purpose, such as the objective and target population. Purposive sampling is most commonly used in qualitative research (Golzar, Noor and Tajik 2022: 3).

Purposive sampling strategy is explained in the sub-section that follows.

3.8.2 Purposive sampling

Stratton (2024: 121) argued that purposive sampling, is a technique where a researcher intentionally chooses participants based on their presence in a population, specific characteristics, experiences, or other relevant factors. The selected sample serves as the study subjects, intended to represent the group or population being studied. Purposive sampling is also known as judgment sampling, as it represents the considered choice of the researcher, regarding a participant in a population. Furthermore, it is a non-random procedure that does not require a determined number of participants or underlying theories. (Etikan, Musa and Alkassim 2016: 2) Purposeful sampling is beneficial, as it typically demands fewer resources, and less time compared to many conventional research methods (Stratton 2024: 121). Purposive sampling can also help ensure the inclusion of a variety of perspectives, such as those from different age groups, family structures, or community roles, enriching the data

and allowing for a more comprehensive understanding. This strategy fits the interpretivist approach of the research, which aimed to inquire about the core experiences of the flood event (Palinkas, Horwitz, Green, Wisdom, Duan and Hoagwood, 2015: 2). Purposive sampling in this context enables the choice of individuals, who have personally experienced a flood and offers new perspectives on its psychological impacts. In addition, given that the study required individuals, families, communities and faith-based organisations, that have direct experience with the flood and its aftermath, the researcher intentionally recruited the ward councillors and leaders of the faith-based organisations to help select the participants.

3.9 The study sample

The sub-section that follows describes the sampling process used in this study.

3.9.1 The sampling process

The sampling process as described by Taherdoost (2016: 3), guided the process within the current study. The researcher began by establishing the target populations and those who could contribute meaningfully to the objectives of the study (Willie 2024: 75). In this regard, there were four populations. The first three consisted of community members from Lamontville an urban area, Tongaat, a semi-rural area and Crossmoor informal settlement, who were victims of the floods. Willie (2024: 75) emphasized the need for defining the features of the target population, to direct the sampling process and enhance its applicability.

The researcher began with a target of 9 from each sector (urban, semi-rural, and informal settlement). This was a projected figure of 27 in total. We started with a figure of 27. However, several more participants were included in order to reach saturation. This saturation was reached as follows : one more person was added from the urban area, five more from the semi-rural area and one more from the informal settlement. The final sample sizes were therefore : Sample 1 urban area = 10; Sample 2 semi-rural area = 14; Sample 3 informal settlement = 10. This has been detailed in the thesis Under Chapter three.

With regards to the faith-based organizations, nine representatives were recruited as part of the fourth sample as there were not many leaders in each organisation (hence 3 were chosen from each faith-based organisation). The final sample size for sample 4 was : For the Christian faith-based organisation = 3; the Hindu faith-based organisation = 3 and the Muslim faith-based organisation = 3. Data saturation was reached as detailed in the thesis.

These sample sizes were adequate due to the principle of data saturation. Moreover, smaller sample sizes are appropriate for qualitative inquiries. Qualitative studies use sample sizes that range from 5 to 30 participants (Ahmed 2025: 3). Prior studies on flood disasters in resource limited countries have shown that total samples of 16 to 30 participants are generally sufficient for developing rich thematic accounts (Ajodhia and Makhanya 2024: 610; Jewkes *et al.* 2023: 1). In this study the 34 participants from the flood affected communities and the 9 participants from the faith-based organisations offered a balance between diverse experiences and were sufficient to ensure the objectives were met.

Qualitative research is premised on data saturation through the recruitment of a small sample size of between five to twenty-six interviews (Hennink and Kaiser 2022: 6). In this study data saturation was understood, as the point at which no further new insights were revealed from the interviews held. In order to achieve data saturation, this principle was used to guide the recruitment and during the analysis of the data, when preliminary coding for each of the four samples was done. When the interview data did not yield any new information or codes, the researcher noted this as evidence of redundancy and that saturation was reached. This occurred by the tenth interview for Sample 1 and Sample 3 and the 14th interview for sample 2. At this stage the researcher made the decision that saturation was reached for the samples. Similarly, for the interviews with the faith-based organisations, preliminary coding was done following each interview held. For sample s4, 5 and 6, after the third interview, the researcher compared the preliminary codes and noted that no new data was emerging. The sample size with respect to the faith-based leaders, did not increase as saturation was achieved with the nine interviews conducted for this sample.

The increase in sample size, to achieve saturation, with regards to the community members is depicted in Table 3.4 which follows.

Table 3.4: Samples and sample sizes

Sample	Type	Initial sample size	Final number of participants per sample
Sample 1	Community members : urban context, Lamontville	9	10
Sample 2	Community members : semi-rural context, Tongaat	9	14
Sample 3	Community members: informal settlement, Tongaat	9	10
Sample 4	Leaders from a Christian based faith-based organisation	3	3
	Leaders from a Hindu based faith-based organisation	3	3
	Leaders from a Muslim based faith-based organisation	3	3

Inclusion and exclusion criteria incorporate the selection criteria used to choose the target population in a study (Patino and Ferreira 2018: 84). The inclusion criteria specify the characteristics of a study population in a clear, consistent, and objective way. Conversely, the exclusion criteria highlight factors or traits that render individuals unsuitable for inclusion in the study (Garg 2016: 642). Well-defined criteria also ensure a more homogeneous sample population by minimizing the confounding factors (Patino and Ferreira 2018: 84). In this study the researcher adopted specific inclusion and exclusion criteria to guide the choice of participants, so that the sample could answer the study questions.

The inclusion and exclusion criteria are listed below for the four samples:

3.9.1.1 Sample 1: People living in Lamontville

Inclusion criteria:

- Participants that lived in Lamontville at the time of the April 2022 floods
- Participants across all racial and cultural groups
- Participants from both sexes and over the age of 21 years
- Participants that are willing to participate in the study
- Participants that experienced negative impact (physical, psychological or social effects) caused by the April 2022 floods

Exclusion criteria

- Participants that did not live in Lamontville at the time of the April 2022 floods
- There will be no exclusions based on racial and cultural groups
- Participants under the age of 21 years
- Participants that did not experience any negative impact (physical, psychological or social effects) caused by the April 2022 floods

The final sample of participants was ten.

3.9.1.2 Sample 2: People living in Tongaat

Inclusion criteria:

- Participants that lived in Tongaat at the time of the April 2022 floods
- Participants across all racial and cultural groups
- Participants from both sexes and over the age of 21 years
- Participants that are willing to participate in the study
- Participants that experienced negative impact (physical, psychological or social effects) caused by the April 2022 floods

Exclusion criteria

- Participants that did not live in Tongaat at the time of the April 2022 floods
- There will be no exclusions based on racial and cultural groups

- Participants under the age of 21 years
- Participants that did not experience any negative impact (physical, psychological or social effects) caused by the April 2022 floods

The final sample size was fourteen.

3.9.1.3 Sample 3: People living in Crossmoor informal settlement

Inclusion criteria:

- Participants that lived in the Crossmoor informal settlement at the time of the April 2022 floods
- Participants across all racial and cultural groups
- Participants from both sexes and over the age of 21 years
- Participants that are willing to participate in the study
- Participants that experienced negative impact (physical, psychological or social effects) caused by the April 2022 floods

Exclusion criteria

- Participants that did not live in the Crossmoor informal settlement at the time of the April 2022 floods
- There will be no exclusions based on racial and cultural groups
- Participants under the age of 21 years
- Participants that did not experience any negative impact (physical, psychological or social effects) caused by the April 2022 floods

The final sample of participants was ten.

3.9.1.4 Sample 4: Members of the Christian, Hindu and Muslim faith-based organisation

Inclusion criteria

- All racial groups included
- Participants over the age of 21 years

- Leaders and members from Christian, Hindu and Muslim based faith organisations
- Faith-based organisations that were actively involved in the provision of humanitarian assistance during the April 2022 floods

Exclusion criteria

- No racial groups excluded
- Participants under the age of 21 years
- Individuals who were not leaders and members of the faith-based organisation
- Faith-based organisations and members that were not actively involved in the provision of aid during the April 2022 floods

The inclusion and exclusion criteria, for samples 1 to 3, ensured that participants from the urban, semi-rural and informal settlement could shed light on their experiences within these contexts. With regards to the sample of faith-based organisations, these participants provided insights with regards to the response of their respective organisations, with regards to the flood disaster.

3.9.2 The recruiting process

3.9.2.1 Samples 1 to 3: Community members

The recruitment of participants for samples 1 to 3 entailed a structured and community-based approach, to secure community members from, Participants from Lamontville, Tongaat and the Crossmoor informal settlement).

In eThekweni the various areas or wards are served by elected councillors who facilitate the provision of service delivery within their wards to improve the life of inhabitants (eThekweni municipality 2024). The researcher sought out each of these ward councillors, as they serve as the community gatekeepers for each sample. They were also able to support the identification and recruitment of participants, affected by the floods, specifically those who met the inclusion requirements. Accessing hard-to-reach community members from diverse demographic backgrounds, and fostering

trust with possible participants, by recruiting through community gatekeepers is acknowledged as beneficial and can improve access to these participants (Singh and Wassenaar 2016: 1).

The ward councillors that represent each of the three identified study sites were contacted through the eThekweni municipality website, by the researcher. Appointments were then scheduled with each ward councillor to discuss the study in detail. During these meetings, the aim, objectives, and ethical considerations of the study were explained, to ensure clarity and transparency with regards to the intent of the study and the recruitment process. To guide the recruitment process, the researcher also elaborated the inclusion and exclusion criteria to the councillors. As the ward councillors had in-depth knowledge of their respective communities, they played a key role in facilitating the recruitment process. They were instrumental in identifying individuals who were directly affected by the April 2022 floods and who met the study's inclusion and exclusion criteria.

3.9.2.2 Sample 4: Faith based leaders

The recruitment process for the faith-based organisations entailed a targeted recruitment strategy, that involved direct engagement with the leaders of each selected faith organisations that served the communities. eThekweni is a multi-cultural metropolitan and represented by a variety of different faiths (Wilson and Pfaff 2008: 1). Hence faith-based organisations that represented the Christian, Hindu and Muslim faiths were identified. The Heads of these organisations were contacted individually by the researcher to introduce the study, the aim, objectives and ethical considerations. Each of the organisations were identified due to their active presence in the community and their involvement in providing support during and after the April 2022 floods. These Heads, served as gatekeepers for their respective organisations. The Heads of the organisations then identified the leaders that were involved in the provisioning of aid during the floods and those who met the inclusion and exclusion criteria, of the study.

The four samples chosen from the different areas of eThekweni, captured the range of experiences, within the affected population. The urban sample represented the various socioeconomic groups, with community members who inhabited primarily independent brick houses. While the informal settlement sample gave insights into the difficulties experienced by some of the most disadvantaged people impacted by the floods, particularly those in shacks, the semi-rural sample, reflected the experiences of individuals living in less developed regions with little infrastructure. The inclusion of faith-based leaders from three religious traditions, enabled a more holistic picture of the role faith-based groups, play in disaster response and community assistance.

In this study, the sampling strategy aimed to capture a wide and diverse range of experiences related to the 2022 KZN floods from samples 1, 2, 3 and 4. Purposive sampling, guided by clearly defined inclusion and exclusion criteria, ensured that participants could provide relevant and insightful information to address the research questions. The study sought to offer a comprehensive multifaceted understanding of the physical and psychosocial effects of the floods on participants. The study also sought to explore the role that faith-based organizations played, in disaster response and recovery. This was achieved by including representatives from faith-based organizations in sample 4.

The sub-section that follows focuses on the data collection process, by detailing the methods used to gather the necessary data from the selected participants.

3.10 Data Collection Methods

Data collection is a crucial step in the research process, as it affects the success of a study. This phase involves systematically gathering information, that will be analysed to address the research questions and fulfil the objectives of the study. The accuracy and dependability of the research outcomes are directly influenced by the quality of the data collected data, which underscores the importance of selecting suitable data collection techniques (Karunarathna, Gunasena, Hapuarachchi and Gunathilake 2024: 1). Data collection has been defined as the systematic process of acquiring,

assessing, and analysing information for research purposes, utilizing established and validated methods (Mazhar, Anjum, Anwar and Khan 2021: 6).

Taherdoost (2022: 14) described two categories of data collection methods, namely primary data collection and secondary data collection. Primary data collection entails the procedures by which the researchers collect the data for the study. Primary data collection methods include surveys, interviews, observation and questionnaires (Karunaratna *et al.* 2024: 2; Mazhar *et al.* 2021: 7). Secondary data involves the collection of data that has previously been collected and published by other researchers (Karunaratna *et al.* 2024: 2). Examples of secondary data include books, journal articles, internet and government sources (Taherdoost 2022: 33). Cresswell and Cresswell (2018: 300) asserted that the data collection steps include boundary setting for the research study, collection of information from participants through interviews; unstructured and semi-structured observations; documents and visual material.

In this study, interviews were the primary data collection method for all four samples. Mwitwa (2022b: 3) described interviewing as one of the most common methods utilised for data collection in qualitative studies and comprises mainly of face-to-face verbal interaction between the researcher and one or more other people. Interviewing is a more flexible and versatile data collection method and allows for small more focused sample sizes (Morgan and Wheeler 2021:7). Getting rich, thorough knowledge with regards to the participants' experiences, viewpoints, and emotions using interviews is a well-known approach in qualitative case studies.

Hence interviews, were used to obtain first hand, detailed accounts of individuals who experienced the 2022 floods. This was adopted as a data collection method, for all four samples. Several factors shaped the decision to use interviews as the main means of gathering data. Firstly, interviews allowed the researcher to thoroughly investigate the personal experiences of participants, which was essential to understanding the complicated psychological and social repercussions of the floods (Dunwoodie, Macaulay and Newman 2023: 864). Secondly, face-to-face interviews assisted the researcher to establish rapport with the participants, thus providing a

secure environment, for them to disclose experiences of the traumatic event (Dunwoodie *et al.* 2023: 878).). Lastly, the interviews allowed the researcher the freedom to modify probes and questions, depending on participant replies. This guaranteed the relevance and completeness of the gathered data (De Jonckheere and Vaughn 2019: 2). Semi-structured as opposed to structured or unstructured interviews were used. This is described in the sub-section that follows.

3.10.1 Semi-structured interviews: samples one to four

Interviews are a key data collection method that involve directly engaging with participants through structured or semi-structured questioning, followed by a documentation of their responses (Karunarathna *et al.* 2024: 5). Hence there is a greater possibility of obtaining confidential data from the interviewees and this requires that the researcher has to have special skills, in order to obtain these confidential insights from participants (Taherdoost 2022: 17). With interviews, the researcher or interviewer must engage in active listening and employ effective questioning techniques, such as probing and prompting, to encourage participants to provide more comprehensive and detailed responses (Paradis, O'Brien, Nimmon, Bandiera and Martimianakis 2016: 263). Interviews also facilitate the establishment of a relationship between the researcher and participants throughout the data collection process and beyond. Both participants' subjective perspectives and the researcher's interpretations of these viewpoints, become central to the interview process thereby allowing for a deeper understanding of the participants' experiences (Camic *et al.* 2003 cited in Dunwoodie *et al.* 2023: 863). Similarly, De Jonckheere and Vaughn (2019: 1) argued that semi-structured qualitative interviews, allowed the researcher to collect open-ended data, to explore participant thoughts, feelings and beliefs related to the experiences of the 2022 floods and to delve deeply into personal and sometimes sensitive issues.

Semi-structured interviews can be undertaken as individual face-to-face meetings or remotely via the online platforms or telephonically (Karunarathna *et al.* 2024: 5). Paradis *et al.* (2016: 263) added that interviews are well-suited for capturing individuals' narratives and experiences regarding specific situations. The data

obtained through interviews, are frequently analysed to identify recurring themes, develop theoretical frameworks, and construct models that enhance the understanding of the subject under investigation. (Paradis *et al.* 2016: 263). Semi-structured interviews, provide a mix between structure and adaptability that lets the researcher cover pre-selected subjects while also investigating newly developing concerns brought up by participants (Taherdoost 2022: 22).

Yin (2016: 142) stated that unlike structured interviews, with semi-structured interviews, the process is not entirely scripted and although the researcher has an agenda, he or she can still question each participant differently according to the background and experience of each participant. Additionally, the researcher during the interview adopts a conversational mode with the participant allowing the researcher to evolve and focus on new emerging areas of inquiry. Kabir (2016: 212) similarly posited that with semi-structured interviews the interviewer uses an interview schedule or guide which outlines the questions to be addressed typically in a specific sequence. It however allows the interviewer the flexibility to explore other related topics that emerge during the conversation if deemed relevant. The researcher conducted individual semi-structured interviews with all 34 participants from sample 1 to 3 and all 9 participants from sample 4. The interview guide which serves as the data collection tool is discussed in the sub-section that follows.

3.10.2 Data collection tool

An interview guide was used for data collection, as this could assist the researcher, in ensuring uniformity throughout interviews, whilst allowing the investigation of original viewpoints and experiences (Bergin 2018: 191). Yin (2016: 147) stated that the interview guide is a critical tool in qualitative research, specifically designed to ensure consistency and depth during interviews. It typically consists of a carefully curated list of key words relevant to the research questions. These terms serve as prompts to direct the flow of the interview, while allowing the interviewer to explore the topic in greater depth, through follow-up questions with each keyword accompanied by a series of probes, designed to clarify the participants' response, encourage elaboration, and prompt the interviewee to reflect on their personal experiences (Yin 2016: 147).

These follow-up questions aim to generate richer, more detailed responses and uncover insights that may not be immediately obvious (DiCicco-Bloom and Crabtree 2006: 316). In this study the interview guides were developed to facilitate a structured yet flexible approach to data collection.

The researcher considered the aim, objectives and research questions as well as the gaps explicit from the available literature to develop the interview guides.

For this research, two distinct interview guides were developed. One interview guide was used for Sample 1 to 3 and another interview guide was used for Sample 4. These are reflected in Table 3.5 below.

Table 3.5: Interview guides for each sample

Samples	Data Collection Method	Interview guide
Sample 1 Participants from urban context: Lamontville	Semi-structured Interviews	Interview guide for sample 1 (Appendix 6a and 6b)
Sample 2 Participants from semi-rural context: Tongaat	Semi-structured Interviews	Interview guide for sample 2 (Appendix 6a and 6b)
Sample 3 Participants from informal settlement: Crossmoor informal settlement	Semi-structured Interviews	Interview guide for sample 3 (Appendix 6a and 6b)
Sample 4: Christian Faith-based organisations Hindu Faith-based organisation Muslim Faith-based organisation	Semi-structured interviews	Interview guide for sample 4 (Appendix 6c)

Each interview guide was piloted prior to being used in the main study. This will be discussed in the sub-section that follows.

3.10.3 Pilot Study

A pilot study is a small-scale trial run conducted before the beginning of the research project, to test the data collection instrument and improve the methodology of the main study (Aziz and Khan 2021: 751). Pilot studies are also useful to determine the feasibility of the main study in terms of resources, time and costs (Malmqvist, Hellberg, Möllås, Rose and Shevlin 2019: 2) as well as to ensure that participants were comfortable with the questions asked (Crick 2020: 409). Pilot studies are also useful as it allows the researcher to clarify and refine the epistemological issues in order to support the understanding of the phenomenon (Aziz and Khan 2021: 750). Following the pilot study, the researcher will be able to improve the research design and modify the data collection instrument which informs the research study (Malmqvist *et al.* 2019: 10).

For this research study, the interview guide was piloted with five participants who were not included in the main study. The same criteria for the selection of the participants that was used in the main study was employed for the pilot. The target population in the study were the individuals who were affected by the April 2022 floods and who provided humanitarian aid during and after the flood event. Four of the participants were individuals affected by the April 2022 floods and one participant was a member of a faith-based organization that provided humanitarian aid to communities during and after the April 2022 flood. The data collection process mirrored the process of the main study. I met with the participants and introduced myself and the purpose of the study. The participants were given a letter of information (Appendix 1a and 1b for participants affected by the floods and Appendix 2 for members of a faith based organization) to read. Once their willingness to participate, was secured the participants were given a consent form (Appendix 3a and 3b for participants affected by the floods and Appendix 4 for members of a faith-based organisation) to sign. Participants were notified that their participation was voluntary and that they could leave, the pilot study at any time during the process. The researcher explained the ethical aspects and that

confidentiality and anonymity will be maintained. The participants were also informed that if they became distressed at any time during the interview, that it would be stopped or continued when they felt ready at another time. Each interview took approximately 45 minutes. Once the pilot study was completed the interview guide was amended by refining the questions.

The pilot study also enabled the researcher to refine his interviewing skills, to adopt a neutral tone and conversational style of questioning to make the participants feel more relaxed. The researcher also observed that the participants had undergone emotional and distressing experiences, which contributed to his in-depth understanding of the phenomenon and managing his emotions during the interview.

3.10.4 Procedure for data collection

Prior to proceeding with the study, ethical clearance was requested and obtained from the Institutional Research Ethics Committee (IREC), at Durban University of Technology (DUT). The ethical clearance number for the study was IREC 283/22 (Appendix 7). A list of gatekeepers for recruitment and access to the samples was determined. A letter requesting permission to conduct the study at the research site was also sent to the different gatekeepers (Appendices 5A-5f), to enable recruitment and access to the participants.

3.10.4.1 Samples 1 to 3: community members

The gatekeepers were the ward councillors of the three areas selected, namely the urban and semi-rural areas and the informal settlement identified in the study. The following councillors were approached:

Sample 1: Councillor from Lamontville (Durban Central) (Appendix 5a)

Sample 2: Councillor for Tongaat (Appendix 5b)

Sample 3: Councillor for Crossmoor informal settlement (Appendix 5c)

Once the gatekeeper permission was obtained for each sample, the researcher made an appointment with each to provide greater clarity on the research study. For samples one to three the gatekeepers identified and selected community members prior to the commencement of data collection. They then provisioned the researcher with a list of names of participants, and their contact details. He then contacted them to set up an interview.

A meeting venue and time was chosen that was convenient for each community member. Participants were interviewed face-to-face at a community centre or in any other space they identified, which was private and noise free. Participants were informed that their participation in the study was voluntary and that they could withdraw from the study at any time. Each participant received a letter of information (Appendix 1a and 1b, and a consent letter (Appendix 3a and 3b). Each letter of information provided information for each participant regarding the aim of the study and an outline of the procedures, the risks to the participant, issues of confidentiality, and the opportunity for counselling or help if required. Permission was also sought to record each interview electronically, to enable transcription and analysis. Each participant signed the informed consent form that was provided in the participant's preferred language. The same interview guide (Appendix 6a and 6b) was used to facilitate the interview.

English was used during most of the interviews, with translators used where needed. This was with regards to isiZulu speaking participants. This ensured that language restrictions did not limit participants' ability to express themselves fully. The researcher also made notes in his diary to record other salient information mentioned during the interview, as well as to capture nonverbal signals, contextual information, and the researcher's thoughts. Phillippi and Lauderdale (2018: 381) emphasized that these notes provide insightful additional data that can help to evaluate interview transcripts. The duration of each interview was approximately 60 minutes, thereby providing enough time for an in-depth inquiry of participants' experiences, with the consideration of possible fatigue or emotional stress. The interviews were concluded when data saturation was reached. The information obtained from the participants was then transcribed by the researcher for analysis.

3.10.4.2 Leaders of the faith-based organisations (Sample 4)

A parallel recruitment process was followed for faith-based organisations. Gatekeeper permission was obtained from the respective Head of each religious organisation, that was included in the study. The Heads, as per the appendices that follow were approached:

Sample 4:

Head of Christian Faith-Based Organisation- Eschol Christian Church (Appendix 5d)

Head of Hindu Faith-Based Organisation- South African Hindu Dharma Sabha (Appendix 5f)

Head of Muslim Faith-Based Organisation – A Gift from the Muslim Community (Appendix 5e)

The researcher made an appointment and met with each Head, to explain the aim of the study. The Head of each organization identified faith-based leaders, within their organizations, for inclusion within sample four. The Head of each faith-based organization, was also included as a participant. All participants were provided with a letter of information (Appendix 2) and a consent form (Appendix 4). As English was the primary language, the letters of information and consent forms were in English.

Participants from sample four were interviewed at each organisation's premises. An interview guide (Appendix 6c) was used to facilitate the interview, as an open-ended dialogue. The interviews averaged 60 minutes in duration and the researcher made detailed field notes. Participants were informed that their participation was totally voluntary, and they could withdraw from the study at any time. Each participant received a letter of information (Appendix 2) and a consent letter (Appendix 4). Each letter detailed information regarding the purpose of the study and an outline of the procedures, the risk or discomforts to each participant and issues of confidentiality. Permission was also sought to record each interview electronically, to enable transcription and analysis. Each participant signed the informed consent form to meet ethical requirements of the study.

The sub-section that follows focuses on the data analysis for this study. The data analysis was done holistically for all four samples.

3.11 Data Analysis

Data analysis is the process of examining raw data that has been collected, in order to make inferences about the information collected (Bhatia 2016: 166). According to Alem (2020: 2) data analysis involves transforming raw data into insightful facts and concepts that can be interpreted either qualitatively or quantitatively. Qualitative data analysis is the process of organizing and interpreting verbal and/or visual content collected, to draw conclusions about both the explicit and implicit aspects, as well as the underlying structures of meaning within the material and what it conveys (Flick 2014: 5). McLeod (2025: 1) further described qualitative data analysis, as a process that collects non-quantifiable data such as imagery, words and sounds to investigate the personal experiences and perspectives, typically through observations and interviews. Irrespective of the data collected, the outcome of a research study is dependent on the data analysis, with the primary aim of acquiring usable, suitable and beneficial information from the data collected (Alem 2020: 2).

Alem (2020: 5) outlined several key methods of data analysis in qualitative studies. These include content analysis, narrative analysis, discourse analysis and framework or thematic analysis. Flick (2014: 24) indicated that of the strategies employed for data analysis, thematic analysis strategy or a coding strategy was the most frequently used. Thematic analysis was adopted to analyse the data. The sub-section section that follows details the thematic analysis process used for this study.

3.11.1 Thematic analysis

Thematic analysis refers to a qualitative research approach, that allows researchers to methodically organize and examine intricate data sets. It involves identifying themes that can encapsulate the narratives present in the data (Dawadi 2020: 62). Thematic analysis can also be described as a research method used to recognise and interpret trends or themes in the data collected, that results in novel understandings of the data

(Elliott 2018: 2850; Maguire and Delahunt 2017: 3353). Patton 2015 (cited in Naeem, Ozuem, Howell and Ranfagni 2023: 2) opined that researchers should not let their own presumptions about the information interfere with the recognition of crucial themes. A thorough thematic analysis approach can therefore yield valuable and reliable results (Nowell, Norris, White and Moules 2017: 2).

Finding significant insights and patterns in qualitative data gathered by means of semi-structured interviews, calls for a methodical and precise process. Verma, Dhiman, Singh, Kaur, Guleria and Singh (2024: 134) argued that that thematic analysis is a versatile and widely used technique for spotting, evaluating, and presenting trends or themes in qualitative data. Many factors guided the choice of thematic analysis. Firstly, it fits the rich, complex stories gathered via interviews as it offers a disciplined but flexible framework for evaluating enormous volumes of qualitative data (Taherdoost 2022: 28). Secondly, thematic analysis enabled the researcher to spot themes that emerged straight from the data, and those guided by current theory and literature, therefore allowing use of both inductive and deductive methods (Proudfoot 2023: 308). Finally, this approach was appropriate for capturing the complexity of the physical and psychosocial experiences of community members as it allowed distinct personal experiences to emerge (Mweshi and Sakyi 2020:191).

The six-phase method described by Braun and Clarke (2021: 331) was adopted to guide this study. This entailed familiarisation with the data, creating initial codes, looking for themes, evaluating themes, defining and identifying themes, and preparing the report. This method guarantees a methodical and thorough examination of the facts and allows flexibility and iteration, all through the process. In the sub-section that follows the researcher details the steps used in the current study, in line with the six-phase method.

- **Step 1: Familiarisation with the data**

Dawadi (2020: 64) recommended that researchers familiarise themselves with the data collected, as this would assist them to determine the type of themes that might become apparent in the data. In the first step the researcher familiarised himself with

the dataset and became observant by looking for patterns in the data. The data was re-read and notes made. According to Byrne (2021: 1398) manually transcribing data is a highly helpful task for the researcher and can significantly assist in delving deep into the data. The researcher also went over the notes made during this phase, to help to contextualise the data and examine how any personal viewpoints could influence the study.

- **Step 2: Generating initial codes**

In this second step, initial codes were generated. Codes for intriguing data characteristics were produced for the entire dataset. The goal of the coding process is to provide brief, concise labels that are either descriptive or interpretive, for bits of data that might be related to the research question or questions (Byrne 2021: 1399). Dawadi (2020: 65) stated that prior to creating codes it was important to reread the transcripts. The researcher, therefore reread all the transcripts carefully and worked methodically through the data collected and considered all the information collected. Coding was done manually for the entire data set. Byrne (2021: 1398) asserted that by manual transcribing the data the researcher can immerse himself into the data. Information that was pertinent was identified and served to inform the developing themes.

Step 3: Generating themes

Byrne (2021: 1403) described the next step of generating themes as this process entailed the review and analysis of all coded data generated to produce themes or sub-themes. The primary aim of this step is to determine patterns across the dataset (Dawadi 2020: 66). Hence the concentration moves away from the analysis of individual data points, to interpretation and analysis of combined significance across the entire dataset (Byrne 2021: 1403). There are no strict guidelines for what constitutes a theme. A theme is defined by its relevance (Braun and Clarke 2006 cited in Maguire and Delahunt 2017: 3356). Byrne (2021: 1403) iterated that construing a theme is not based on the frequency of codes obtained, but also informed by data

items that help answer a research question. In this step the researcher started to arrange and combine the codes according to possible themes and subthemes.

Step 4: Reviewing themes

Step four involved a review of all the potential sub-themes and themes generated in order to refine and present the themes in a more methodical manner (Dawadi 2020: 67). The researcher read all the information linked to each theme and reconsidered if the data supported each theme. Some themes were consolidated, some separated, and others were discarded, if they lacked sufficient supporting material in this step. To further the credibility of the analysis, the researcher shared the developing themes and their interpretations with the supervisor (Verma *et al.* 2024: 140). These meetings provided the chance to talk about new ideas, question presumptions, and consider many data interpretations thereby assuring that the results are based on the data instead of the researcher's assumptions.

Step 5: Defining and naming themes

According to Braun and Clarke (2006: 92), the goal of this step was to further refine and define the themes in order to understand what each theme was about and to determine which data to include for each theme. Byrne (2021: 1407) elaborated that in this step all the themes should combine, to build a coherent story that is informative with regards to the research question and be consistent with the content of the dataset. In this step the researcher relooked at each theme and sorted the themes into a consistent and comprehensible account of the 'story' that the researcher wanted to impart in relation to the research questions (Dawadi 2020: 69). This step also allowed the researcher to contemplate each theme and minimise overlapping as much as possible.

- **Step 6: Producing the report**

The last step in the process entailed writing up the report on the findings (Dawadi 2020: 70). The sequence in which the themes are reported should connect in a logical manner creating a narrative (Byrne 2021: 1410). In this step, the researcher ensured that a reasonable and logical account of the narrative, represented by the data across all themes was provided. This step also allowed the researcher to tie the findings back to the research objectives and the literature.

Having discussed the process of data analysis, the sub-section that follows details the significance of establishing trustworthiness in qualitative research and the numerous criteria that can be used to attain this.

3.12 Trustworthiness

Qualitative studies are distinct as it gives researchers access to narratives and storied facts that are more directly tied to experience. Trustworthiness denotes the procedures that a researcher follows, while conducting a study to ensure that the results do not dispute reality (Stahl and King 2020:26). Given the subjective nature of the study, it is important to ensure trustworthiness of qualitative findings (Dodgson 2019: 220). There are four criteria which are considered for trustworthiness namely, credibility, transferability, dependability, and confirmability (Stahl and King 2020: 26). These are discussed in the sub-sections below.

3.12.1 Credibility

Credibility refers to how accurately the researcher represents the views, experiences, and perspectives of the participants. It is about ensuring that the findings truly reflect what the respondents shared (Nowell *et al.* 2017: 3). Credibility is important in order to establish confidence that the results are true, credible and believable (Lincoln and Guba 1986 cited in Forero, Nahidi, De Costa, Mohsin, Fitzgerald, Gibson, McCarthy and Aboagye-Sarfo 2018: 3). In this study, the researcher ensured that the data was accurately construed, according to the experiences lived, perceived and reported by

the participants. There was a conscious and dedicated attempt by the researcher with regards to sustained and quality engagement, with the participants before the data collection process. This enabled building of confidence and rapport with the participants, while also providing sufficient time to ensure that rich information and quality data was collected. Another very vital strategy used for building credibility was triangulation. Gunawan (2015: 10) defined triangulation as the use of many data sources or approaches to help verify the results. Data triangulation was accomplished by gathering material from two groups of participants, namely representatives of faith-based organisations and flood affected people from urban, semi-rural, and informal communities.

3.12.2 Transferability

The concept of transferability relates to the degree of applicability of the findings from the research to the context and the setting (Kakar, Rasheed, Rashid and Akhter 2023: 155). Stahl and King (2020: 27) maintained that in as much as it is important to learn from emerging qualitative research, it is equally important to gain insight and understanding from other researcher's qualitative inquiries. Nowell *et al.* (2017: 3) argued that whilst the researcher cannot know all the sites that require transferability, it can provide robust descriptions that allow the reader to transfer the findings, to their site as needed. Transferability was achieved by providing thorough explanations of the study setting, the participants, the data collection process and the participants' experiences thereby enabling transferability of the results to different settings (Drisko 2025: 106). The researcher also sought to include a wide array of participants from various contexts, an urban area, semi-rural area, and an informal settlement and members of various faith-based organisations. As Kakar *et al.* (2023: 156) opined, this diverse sample improved the possible transferability of the results.

3.12.3 Dependability

The criterion of dependability is applied to qualitative research studies, to ensure that findings from a qualitative inquiry are repeatable, if the inquiry occurs with the same cohort of participants, coders and context (Lincoln and Guba 1986 cited in Forero *et*

al. 2018: 3). Ahmed (2024: 2) similarly described dependability as meaning that the findings of the research are consistent over time. In qualitative research, precise replication is difficult, hence processes are used to improve the study's reliability. In this study the researcher documented each step of the research process throughout the investigation. This ensured transparency and will allow others to assess the dependability of the results and replicate the study by following the steps (Ahmed 2024: 2). Consistent use of the same interview techniques across all participants, helped to guarantee dependability in data collecting. Although the semi-structured nature of the interviews allowed for flexibility, the fundamental questions stayed the same to guarantee that related subjects were covered across all the participants. The researcher checked constantly to ascertain if the findings were in line with the data obtained from the interviews.

3.12.4 Confirmability

Confirmability, also known as objectivity, is the ability of a researcher to assess data without bias, including social-desirability bias, which may be present since researchers create and implement the tools (Nyirenda, Kumar, Theobald, Sarker, Simwinga, Kumwenda, Johnson, Hatzold, Corbett, Sibanda and Taegtmeyer 2020: 2). Confirmability is related to establishing that findings and interpretation reached by the researcher are derived from the data (Nowell *et al.* 2017: 3). Nowell *et al.* (2017: 3) advised researchers to incorporate markers such as the justifications for theoretical, methodological, and analytical decisions for the reader to understand the reason why decisions were made. This perspective on trustworthiness seeks to remove researcher bias. The researcher ensured that he was aware at all times of potential personal biases and emotions and ensured that this did not impede with the research. Furthermore, the documentation of the research process, offered a record of data collection, analysis, and interpretation which further supported confirmability. Nowell *et al.* (2017: 3) emphasized that confirmability is determined once the initial three criteria for trustworthiness (credibility, transferability, and dependability) are attained. This process allows readers to follow the evolution of the results and evaluate how much they are based on facts, instead of the researcher's opinions.

3.13 Expert validation committee

An important strategy for establishing credibility in qualitative studies is peer debriefing (Kaker *et al.* 2023: 162). Peer debriefing refers to the process in qualitative research where researchers interact with experts or colleagues to discuss interpretations of the data and reduce personal biases in order to enhance the trustworthiness of the research study (McLeod 2025: 2). To improve rigor and credibility, the researcher established an expert validation committee. An expert validation committee is a group of specialists or experts tasked with reviewing the quality, relevance and integrity of the data collected during the research process. The role of the committee includes the provision of guidance and support to the researcher, to enhance the quality of the research. The committee looks at the ethical standards observed during data collection as well as the research methodology and provides constructive feedback regarding the validation of the data. Their feedback was instrumental in refining the study's findings and enhancing its trustworthiness.

3.13.1 Selection of the Expert Validation Committee

In this study the researcher recruited a diverse group of experts linked to the study topic. The committee was composed of five experts who were selected based on their experience and expertise in research and the subject area of the study. Table 3.6 details the qualification and area of expertise of the committee members. The selection process involved the following criteria:

1. **Academic and Professional Qualifications:** Experts were required to hold a Doctorate or be pursuing a Doctoral degree
2. **Subject Matter Expertise:** Members had specialized knowledge related to the field of study, ensuring their ability to critically evaluate the themes and findings.
3. **Independence from the Research:** To minimize bias, individuals without prior involvement in the study were chosen.

Potential committee members were identified through academic networks and professional organizations. Invitations were sent via email and WhatsApp, detailing

the scope of their role and the expected time commitment. Upon acceptance, a meeting was set up.

3.13.2 Meeting: Method and Review of Themes

A formal meeting was set up which was conducted over Microsoft teams over two hours. The researcher presented the research title, the objectives of the study and a brief overview of the research methodology. The researcher opened the meeting and welcomed the committee, introduced the study, the title, aims and objectives of the study. The researcher also presented the themes and sub-themes that arose from the data analysis, including some selected excerpts. The role of the committee was to review the objectives and methodology used and review the themes and sub-themes. The committee was requested to provide feedback. During the session the committee considered the soundness of the themes and sub-themes obtained, the adequacy of the evidence and the consistency of the interpretation of the findings made across a cross section of all the themes.

The committee after examining the information and interpretations agreed with the conclusions reached. The researcher and the committee engaged on the feedback which focused on methodological rigor and interpretive insights (McLeod 2025: 5).

3.13.3 Feedback and refinements

Throughout the feedback the researcher was open to the feedback and critical analysis and listened actively, as the researcher understood that the aim of the debriefing, was to improve the quality of the research. The key points discussed included the importance of developing a recovery model and disaster management plan that can be utilized for future disasters, as the areas within eThekwinini have been affected by multiple floods and other natural disasters. The committee also advised that as this was an important topic that could contribute meaningfully to ensuring individual, family and community well-being during future disasters. They suggested that more information and wording on the disaster management cycle, in terms of pre-disaster, the disaster phase and post-disaster should be included and linked to the vulnerability

of the samples affected. Following the feedback received, the researcher reviewed the work considering the insights shared.

The expert validation process enhanced the trustworthiness of the study as their knowledge and experience allowed them to scrutinize the data through multiple lens and perspectives. This reduced the risk of bias and ensured that the final themes accurately represented the data. The committee also confirmed the credibility of the data as they compared the methodology used in the study and the themes and sub-themes derived with their knowledge and experience. The final thematic framework was developed based on consensus, ensuring its reliability and trustworthiness.

Thus the researcher sought to provide results that faithfully reflected the experiences of individuals, affected by the April 2022 floods while preserving a strict and open research process by means of strategies to improve credibility, transferability, dependability, and confirmability. Throughout the data collecting and analysis process, the researcher made sure that quality and rigor were maintained.

Table 3.6 Excerpts from the validation committee

Validation committee member (VCM)	Details of committee member and areas reviewed	Sample of responses
VC 1	Academic – Professor in Statistics Reviewed Objectives and Theme: Experience of the floods[Physical and mental effects	<i>“It’s a very important topic, because of the extreme events, to understand the nature and the problem of the 2022 floods, worth finding out more information. Appreciate the direction taken by you in the form of a qualitative study. The themes are relevant. Are you going to develop a recovery model based on the results of the study Propose something that can add to building a plan for disaster management”.</i>

	and Life in the shelter	
VC 2	Academic – PhD lecturer Reviewed: Objectives, Methodology, Data analysis for all themes	<i>“It’s good to emphasize that this is a novel study. Add other studies and emphasize the similarities. Good methodology and data analysis. Objectives are clear. The themes are clear and relevant to the research questions. The themes capture the data accurately. I know the themes of experiences of the participants and the displacement that took place is what occurred. The themes on psychosocial effects and role of the faith-based organisation is very enlightening”.</i>
VC 3	Subject matter expert – disaster management Reviewed: Literature review, Themes on experience of the floods, physical and mental effects, life in the shelter and role of faith-based organisations	<i>“The disaster management cycle is important. Maybe link the effects to the vulnerabilities of people, emanating from physical, social, economic aspects. The data is a true reflection of what happened and you have used literature to support your findings. You interpreted the data correctly and the theme on faith-based organisations and the sub-themes on humanitarian aid and spiritual support is a great addition to the subject”.</i>
VC 4	Academic – PhD interest in survival analysis and disasters	<i>“The word ‘Understand’ is discouraged in research as its too broad. How to measure. Choose another word. Participant selection was good. Inclusion and exclusion criteria applicable. Themes generated were applicable as well”.</i>

VC 5	Municipal worker – Disaster management Reviewed: Objectives and all themes	<i>“The findings are accurate. And the areas you have chosen where affected by the floods. The study will be able to provide more information for us to use. The themes and sub themes capture what happened in the areas where the floods occurred. These findings are exactly what happened to a lot of people especially those living in poorly built homes”.</i>
------	--	--

The next section focuses on the ethical issues that were followed when conducting research.

3.14 Ethical considerations

Ethics address moral issues pertaining to research practices (Mirza, Mirza and Bellalem 2023: 3). According to Bos (2020: 31) ethics is an inquiry into what is just and unjust and what the researcher should do. Hence research ethics ensures the protection of the rights and avoidance of possible harm to participants in the research study (Kara and Pickering 2017: 1). Any research project should first prioritize ethical issues, especially when handling delicate subjects like natural catastrophes and their psychosocial effects. The ethical concerns pertinent to the present study are discussed in this sub-section.

3.14.1 Ethical approval

The study received ethical clearance after it was reviewed by the Institutional Research Ethics Committee (IREC) of Durban University of Technology (IREC 283/22I). This body reviewed and approved the research plan including all the data collection tools and consent forms. Mehta, Zimba, Gasparyan, Seil and Yessirkepov (2023: 4) described this procedure as one in which an impartial committee carefully reviews the study design, methods, and ethical issues.

Permission was also sought from relevant gatekeepers namely, the ward councillors for Tongaat (semi-rural area), Lamontville (urban area), Crossmoor informal settlements and the leaders of each faith-based organisations, before participants were recruited. As Singh and Wassenaar (2016: 1) observed obtaining gatekeeper permission assists with access and adherence to community standards for the study being conducted. Additionally, the researcher conducted regular meetings with the research supervisor during the project, allowing the researcher to address any developing ethical questions or dilemmas. This supervision helped to ensure that the study stayed compliant with moral ethical issues throughout its lifespan.

The following ethical principles were considered for the study and are discussed below.

3.14.2 Informed Consent

Informed consent entails the provision of information to the potential participants about what the research project is about, what the interview involves and allowing them the opportunity to establish participation (Wiles 2013: 25). By ensuring that participants understand the nature, potential advantages, and potential hazards of the research, it protected their rights and empowered them to make an informed and independent decision about participating (Arellano, Alcubilla and Leguízamo 2023: 1). In this study the researcher used an informed consent approach to ensure that every participant fully understood what the research entailed. The researcher issued all participants from all four samples with a letter of information (Appendix 1 and Appendix 2) and a consent form (Appendix 3 and Appendix 4) prior to the commencement of the interviews. The letter of information detailed information about the study, its aim, processes and risks. The letter was translated isiZulu for participants who could not understand English. Twimukye, Nabukenya, Kawuma, Bayigga, Nakijoba, Asiiimwe, Byenume, Ojara and Waitt (2024: 11) advised that translating material into local languages, guarantees understanding for every participant. Clear, understandable language was used with every effort to avoid technical jargon. Participants had the opportunity to ask questions regarding the research study, thereby allowing them the opportunity to decide whether they wanted to be involved in the study. The researcher

allowed time for questions and for clarification before every interview. Every individual who accepted to participate in the research signed a written consent letter.

3.14.3 Confidentiality and Anonymity

Management of confidentiality and anonymity is closely related to the management of consent because before giving consent, participants must be made aware of confidentiality issues and how anonymity will be managed (Wiles 2013: 41). Confidentiality entails the protection of the raw data obtained and publication only of aggregated results without participant identifiers (Badampudi, Fotrousi, Cartaxo and Usman 2022: 3). Hence the terms confidentiality and anonymity, although distinct concepts are interlinked (Wiles 2013: 41). In this study the researcher did not mention any of the participant's names. All participants were given pseudonyms thereby protecting the identity of the participant during the reporting phase. The voice recordings and transcripts were stored on an encrypted, password protected USB device and stored together with the informed consent documents in a locked cupboard, that was only accessible to the researcher. Ensuring anonymity and confidentiality not only shields participants from any danger, but also promotes honest and open answers (Kang and Hwang 2023: 2).

3.14.4 Minimizing risk of harm (Beneficence)

An essential component of ethical research practice is guaranteeing the security and welfare of research participants. Even though many qualitative studies may only present little risks to participants, it is crucial to consider the potential hazards (Wiles 2013: 55). Researchers need to ensure that harm to participants and organizations should be minimised (Badampudi *et al.* 2022: 3). Kang and Hwang (2023: 8) emphasized that beneficence involves acting with kindness and compassion when conducting a study. In this study the researcher ensured the wellbeing of the participant during the interview, by putting them at ease and, listening to them express their views. At all times the researcher was sensitive to the participants emotional wellbeing by being aware of their body language and signs of distress. The interviews were also conducted in a private area safe to the participants.

During a research study, all participants must be treated with respect and the researcher was respectful of each participant's age, sex, race, religion, political belief and lifestyle (Mirza *et al.* 2023: 3). The researcher was aware of and respectful of each person's cultural norms.

3.15 Conclusion

The methodological approach used in this research study was described in this chapter. A qualitative, case study design, helped capture the rich, complex experiences of flood-affected people and members of faith-based organisations.

The sampling approach used in the research ensured a wide spectrum of viewpoints by means of deliberate selection of participants from urban, semi-rural, and informal settlement regions, as well as from faith-based organisations. Through semi-structured interviews, participants could share their experiences.

This study adhered the Durban University of Technology's IREC principles of conducting research. Throughout the study procedure, strict ethical standards were followed in gaining informed permission, guaranteeing anonymity and confidentiality, thereby reducing risks.

The thematic analysis technique used for data analysis enabled a methodical approach to developing the themes which are presented in the Chapter that follows. Ensuring the rigour and credibility of the study results depended on strategies to improve validity, dependability, and trustworthiness. The chapter that follows presents an analysis of the data collected.

CHAPTER 4: ANALYSIS AND DISCUSSION OF FINDINGS

4.1 INTRODUCTION

The preceding chapter detailed the research methodology, used to guide the current study. Chapter 4 is a presentation of the data, and a discussion of the findings made in relation to the data. In line with the research questions, six themes emerged from the data. These included: (1) the experience of the floods; (2) impact on physical health; (3) mental health sequelae of the floods; (4) life in a shelter; (5) role of religious organizations and (6) community support. The subthemes that are interlinked with each of these themes are presented in Table 4.1 that follows. Each of the themes and sub-themes are substantiated with narratives from the data and relevant literature. In addition to a presentation of the data and a discussion thereof, the chapter contains several sub-sections related to the demographic profile of the participants (section 4.4).

The analysis and discussion include narratives, which reflects the intricacies and complexities of the experiences of participants during the April 2022 floods. The presentation of the data interfaces with the research objectives, thereby highlighting the relationship between the data and the conclusions drawn.

4.2 Thematic analysis

The themes and subthemes that are presented emerged through a process of thematic analysis, which is a systematic and structured way of analysing qualitative data (Liebenberg, Jamal and Ikeda 2020: 55). Thematic analysis is based on an iterative process of analysing the data, starting with familiarisation with the entire body corpus followed by the coding of crucial insights, views, perceptions and divergences in the data (Liebenberg *et al.* 2020: 55). Through a series of iteration, coded data is categorized into sub-themes and themes. Thematic analysis often follows a standard procedure that commences with familiarisation with the data, to the preliminary coding and categorisation of coded data into themes which are further refined into sub-themes

and themes which represent crucial insights, patterns, views and major issues in the body corpus.

The use of thematic analysis in this study was based on the overarching need to unearth a nuanced understanding and presentation of the effects of flooding on families and communities and to draw insights from the data. To enhance credibility, this thematic analysis process, employed an emergent coding frame as opposed to one that was pre-existing, with a view to covering all the key insights within in the data (Liebenberg *et al.* 2020: 55). Hence the emergent coding frame has been adopted which captures salient issues from the data set in an orderly manner, free from preconceived biases. The refined themes and sub-themes from the study constitute of the report of this study.

4.3 Research objectives and analysis themes

In this section the fit between research objectives and emerging themes are presented, thereby ensuring that the analysis effectively addresses the research objectives. To this extent, there is synergy between the research objectives and the emergent themes and sub-themes distilled through thematic analysis from the body corpus of the data, as elucidated in Table 4.1 below.

Table 4.1 Objectives and themes

Research objectives	Themes and sub-themes
To understand how individuals and their families experienced the April 2022 KZN floods.	Experience of the floods - Personal experiences of the flood - Housing structures and the impact - Loss of belongings and documents - Vulnerable households

	Impact on community infrastructure and utilities
To explore the health, psychological and social effects of the floods on individuals and on their family life.	Experience of the floods Impact on physical health - Physical injuries related to the floods - Chronic health conditions Mental Health Sequelae - Acute fear and anxiety - Fear - Sleep disturbances and flashbacks - Sadness and depression
To inquire about how their physical circumstances were affected by the floods	Life in the shelter - Initial Relief and Support - Experience of living in the flood relief shelter - Life in the shelters and the impact on physical health - Alcohol use and disruptive social behaviour - Psychological effects of displacement Community support - Formal support of community - Informal support received - Personal prayer and religiosity as a coping mechanism

To inquire how faith-based organizations supported families and communities during this natural disaster.	Role of faith-based organisations - Religious philosophy underpinning faith-based organizations - Instruments of humanitarian aid - The impact of floods through the lens of faith leaders - Nature of humanitarian aid - Spiritual support provided - Things that could have been done differently
---	---

4.4 Demographic profile

The demographic profile of the participants is presented in this section. The following key issues are profiled in the tables that follow: gender, age, marital status, employment status, income source and number of dependents. These are outlined in Table 4.2 and Table 4.3 below.

Table 4.2 Demographic profile of participants

Participant	Age	Gender	Marital status	House structure	Employed	Source of income	Number of dependents
Crossmoor							
1	42	F	M	Shack	N	None	4
2	37	M	M	Shack	Y	Salary	0
3	34	F	M	Shack	Y	Salary	2
4	38	F	S	Shack	N	None	4
5	38	F	S	Shack	N	Grant	2

6	37	F	S	Shack	Y	Salary	3
7	24	M	S	Shack	Y	Salary	1
8	37	M	S	Shack	Y	Salary	2
9	42	F	S	Shack	N	Grant	2
10	54	M	D	Shack	N	None	1
Tongaat							
11	24	F	S	Mud Dwelling	N	None	1
12	40	F	S	Mud Dwelling	N	None	3
13	58	F	D	Mud Dwelling	N	None	2
14	27	F	S	Mud Dwelling	N	None	2
15	49	F	S	Mud Dwelling	N	None	2
16	48	M	M	Mud Dwelling	N	None	4
17	29	F	M	Mud Dwelling	N	None	3
18	58	M	M	Shack	N	None	3
19	51	F	S	Shack	N	None	4
20	54	F	S	Shack	N	None	3
21	29	F	S	Shack	N	None	2
22	60	F	S	Shack	N	None	4
23	42	F	S	Shack	N	None	2
24	26	F	S	Shack	N	None	1

Lamontville							
25	59	M	S	Brick	N	Grant	
26	62	M	S	Brick	Pensioner	Pension	2
27	33	M	S	Brick	Self	Income	4
28	32	F	S	Brick	N	None	1
29	60	F	S	Brick	Y	Salary	3
30	21	F	S	Brick	N	None	1
31	29	F	S	Brick	Y	Salary	5
32	59	M	D	Brick	N	None	6
33	28	M	S	Brick	Y	Salary	2
34	25	M	S	Brick	Self	Income	4

Table 4.3: Demographic profile of participants from the faith-based organisations

Participant	Age	Gender	Number of years in the organisation
1	46	M	25 years
2	71	M	35 years
3	73	M	37 years
4	75	M	53 years
5	68	M	5 years
6	49	M	6 years
7	36	M	5 years
8	52	F	4 years
9	50	F	4 years

4.4.1 Gender profile

The gender profile of the participants from all three study areas, reflects a predominance of females in the sample. There were 20 females in total and 14 males. This imbalance may have been, because most males were away at work and not available for interviews, during the recruitment. Another plausible explanation is that there are more females than males in terms of population distribution, within the selected study sites (Statistics South Africa 2022: 15). In terms of the faith-based organisations, the gender profile was dominated by males, with 77% (7 out of 9) of the sample being male. Traditionally men have been known to occupy faith-based leadership roles, with women occupying lesser positions as pastors, priests and moulanas (Muslim scholar) within religious organizations.

4.4.2 Age distribution

In terms of the age distribution, most of the community sample were between the ages of 25 to 49 years. The rest of the sample were 50 years and over and consisted of 10 participants in this age bracket. The age distribution was representative, enabling the study to benefit from a range of insightful contributions from young adults to those who were middle aged and the elderly population as well. As the inclusion criteria was for participants over the age of 18, the researcher was able to get rich insights into the impact of the floods on children through the lens of their parents. With respect to faith-based organisations, the age range of the sample was between 36 years to 75 years, indicating a mature group. It reflects that they were predominantly older adults, who were occupying leadership positions within their respective faith organizations.

4.4.3 Housing design structure

This section reflects the nature of the housing structures of the community participants. There were three primary design structures namely, brick, mud or shack prior to the floods. A significant number of the participants from the areas targeted lived in vulnerable housing structures. There were mainly shacks (Crossmoor, Tongaat) or mud houses (Tongaath), reflecting a greater number of poor and vulnerable

households, within the sample. This is supported within the literature, which suggests that natural disasters affect disadvantaged communities more greatly. This is because such householders cannot afford land in more prime areas on higher ground and hence resort to erecting their homes in riskier, low-lying land, alongside riverbanks so they can access water as well (Dlamini *et al.* 2024: 4).

4.4.4 Marital status

Within the community sample, most householders were single, as compared to them being married. Amongst the participants, eight were married/divorced and twenty were single. This is in line with reports in the 2023 General Household Survey, which indicated that female-headed households, were most common in Provinces with large rural areas such as the Eastern Cape, Limpopo and KwaZulu-Natal (Statistics South Africa 2024: 5). It also accounts for why the community sample was more predominantly female.

4.4.5 Occupation

The occupational profile of the community participants reflects that most of them (21 participants) were unemployed. Of these participants three were dependent on government grants. This supports the notion that these households were in a poorer-socio-economic group, which added to their vulnerability, in the aftermath of a natural disaster. One participant was a pensioner whilst the remaining others had some form of employment.

4.5 Section B: Analysis and discussion of findings

This section presents an analysis and discussion of the findings made. Guided by thematic analysis techniques and the research objectives, six themes emerged from the data which are then presented in the section that follows. Table 4.4 elucidates the research objectives below.

Table 4.4 Research objectives

Number	Objective
1	To understand how individuals and their families experienced the April 2022 KZN floods.
2	To inquire about how their physical circumstances were affected by the floods.
3	To explore the health, psychological and social effects of the floods on individuals and on their family life.
4	To understand how communities were affected during the floods.
5	To inquire how faith-based organizations supported families and communities during this natural disaster
6	To make recommendations on how families and communities may be assisted at both the family and community level post the floods.

4.6 THEMES

There were six (6) themes and twenty-five (25) sub-themes which emerged from the research findings. These are outlined in Table 4.5. A comprehensive discussion of the findings follows.

Table 4.5 Main themes and sub-themes

Main theme	Sub-theme
1. Experiences of the floods	i. Personal experiences of the floods ii. Housing structures and the impact iii. Loss of belongings and documents iv. Vulnerable households

	v. Impact on community infrastructure and utilities
2. Impact on physical health	i. Physical injuries related to the floods ii. Chronic health conditions
3. Mental Health Sequelae	i. Acute fear and anxiety ii. Fear iii. Sleep disturbances and flashbacks iv. Sadness and depression
4. Life in the shelter	i. Initial Relief and Support ii. Experience of living in the flood relief shelter iii. Life in the shelters and the impact on physical health iv. Alcohol use and disruptive social behaviour v. Psychological effects of displacement
5. Role of religious organizations	i. Religious philosophy underpinning faith-based organizations ii. Instruments of humanitarian aid iii. The impact of floods through the lens of faith leaders iv. Nature of humanitarian aid v. Spiritual support provided vi. Things that could have been done differently
6. Community support	i. Formal support of community

	ii. Informal support received iii. Personal prayer and religiosity as a coping mechanism
--	---

The themes and sub-themes reflected in Table 4.5 will now be discussed and substantiated with narratives, drawn from the participant interviews. The narratives of both the community participants and the faith-based leaders will be presented, to support the analysis, reflecting the interrelatedness between the participants' experiences and the themes and sub-themes, which have been identified. Theme one is discussed in the sub-section that follows:

4.6.1 Theme 1: Experience of the floods

The first theme that emerged from the data related to the personal experiences of the participants during the floods. There were four sub-themes that emerged under the first theme, namely, (i) personal experiences of the flood; (ii) damage to homes; (iii) loss of belongings and documents and (iv) impact on community infrastructure and utilities. The first sub-theme that emerged from the data reflected the personal experiences of the participants at the time of the flooding.

4.6.1.1 Sub-theme 1: Personal experience of the floods

This subtheme focused on individual participants' experience of being at home, when the flooding began. It focused on the immediate personal impact of this experience, their feelings of safety or danger, and the disruption it caused.

The participants described the experience as follows:

"I was in my room sleeping with my husband, my two children and my sister's child. My house is near the river. At midnight, rain was pouring. I heard the mango tree falling. I asked my daughter, who is eleven years old, to jump to our neighbour, and my son, and my husband remained inside the house." (P1)

“When the floods came, I was asleep in my house with my four children. I woke up to the house full of water. What was being seen was just the roof. I just sat there in the house with my children and was also pregnant at that time.” (P4)

“I was alone sleeping in the house at the time with my two kids. That day, I knew it was going to rain since a friend had told me. So, I did not go to work. I used to work as a commuter taxi conductor. I woke up to find the house flooded, and almost everything washed away.” (P8)

“The water was just coming in and it was so scary. I was floating in the water in the room trying to find my way to the door. Everything was around me and I was getting stuck. As soon as I was out of the house, the house collapsed.” (P13)

“The whole time it was raining we were trying to save the roof of the house. Everywhere it was leaking, and the furniture was getting damaged. We went to sleep and at around 1am I woke up, I thought the roof was going to fall in. The water was also flooding in through the windows and doors. We didn’t have any more towels to soak up the water.” (P21)

These narratives reflect that the heavy rains, which had begun unexpectedly caught many of the participants unaware. This increased their risks to the substantial dangers that followed very quickly. Several participants were asleep in their homes and awoke to find that their homes were submerged in water. Their stories reflect their deep vulnerability to the flood waters which rapidly filled their homes and placed them and their young children in grave danger. As one of the participants shared, because the heavy rainfall had occurred very late at night, whilst they were asleep, they had little time consider how to deal with the situation. One mother had to ask her child to jump to safety, whilst other participants described that they were “floating, “in the floodwaters in their home. She became caught within household items, which were floating around her, thereby hampering her escape. The immense dangers linked to rapidly building flood waters was revealed, as no sooner had she escaped, the house collapsed. One of the mothers described how she had to ask her eleven-year-old daughter to jump to safety, after an uprooted mango tree fell onto their home. Spencer

and Thompson (2024: 1) emphasized the vulnerability of children and young people, during natural disasters saying that they could become entrapped in their homes and run the risk of injury and other negative outcomes. Tellman *et al.* (2021: 4) asserted that flooding endangers children specifically, as they lack sufficient strength to stay on their feet, when currents build up rapidly. This heightens their risk of drowning and injury from debris, even if they can swim in shallow waters.

Those who stayed in their homes, tried to save their household items, but the rainwater was too strong and rapidly entered through the windows and doors. The impact of the heavy continuous rainfall, was experienced mostly during the night, complicating their escape or ability to salvage their belongings. These experiences cohered with reports in newspaper articles in the Daily Maverick and the IFRC Disaster Law, which described the April 2022 floods as follows: “The rain and floods came at night when many were sleeping, making the event even more deadly” (Da Costa and Serradinho 2022: para. 1 line 8). Given the intensity of the rainfall, the media began to caution communities urging them not to sleep. “The river is rising. There’s more rain on the way. Be ready to evacuate” (Joubert 2023: para. 2 line 1).

Several other writers also noted the complexities related to flood events, asserting that flooding escalates at short notice, giving affected families limited time to evacuate or respond to the impending dangers and threat to their household items. Musyoki *et al.* (2016: 5) argued that floods can overwhelm unsuspecting populations, crippling their ability to respond, especially when the flooding happens at night, when people are asleep. According to Baran-Zgłobicka, Godziszewska and Zgłobicki (2021: 1), this adds to their confusion, paralyzing their efforts to escape or seek refuge on higher grounds. The ability of the young and elderly to escape are often hampered by their physical vulnerability, as they can be most easily swept away by the floodwaters. Ruin, Gaillard and Lutoff (2008: 2) concurred with these views, saying that the rising floodwaters are extremely hazardous for those asleep in their homes, posing considerable risks to the health and safety of those most vulnerable.

Acosta-España, Romero-Alvarez, Luna and Rodriguez-Morales (2024: 458) opined that flood waters bring additional risks of contamination, by exposing people to

waterborne diseases and infections. The risk of drowning, injury from debris, and exposure to hypothermia, are added dangers within such situations (Frasqueri-Quintana, García, Adams, Torres-Figueroa, Iriarte, Ryff, Sánchez-González, Gómez, Pérez-Rodríguez and Alvarado 2019: 63; Burton *et al.* 2016: 241). The combination of these factors therefore underscores the need for prompt evacuation and effective flood response measures to safeguard the health and safety of those affected.

Several participants shared that they were not asleep when their homes began to flood, leaving them helpless as the floodwaters rapidly entered their homes. They said:

“I was at home with my two children, who are aged 12 and 9 years. I could not sleep because I was monitoring the flow of water in the nearby river. My house was quite close to the river. I had observed that the river was flooding. When the river flooded and water started entering my 5-roomed house, I took my children and ran far away from the river and the house leaving everything behind.” (P9)

“It was raining for so many days now, and we were sitting outside by the shebeen. The water was getting higher in the roads, you couldn’t see the roads. People were trying to sweep the water away from their house. The ladies and children had buckets and trying to get the water out of their house.” (P16)

“I was watching the stream behind our houses. As the time went by it looked like it was now a river. It was so loud. It was pushing the banks away and becoming bigger. Soon it was going to wash my house away. My children were scared, but it was hard to move them because it was raining so heavily. I didn’t know what to do.” (P18)

One participant shared that because she lived close to a river, she had become hypervigilant, constantly monitoring whether it was flooding. Her narrative reflects her heightened anxiety and fears, as she became increasingly aware, that she was in danger. She shared that once she realised that the river had broken its banks, she had

to abandon her home and flee with her children to reach a point of safety. Other participants expressed dismay and helplessness as the water levels rose, not knowing how to react, despite the impending danger. One of the most significant aspects emerging in the data, was that natural disasters transcend age and socio-economic status, crippling those most vulnerable.

The narratives that follow, reflect how the flood waters had created a trail of destruction, leaving many families homeless:

“The floods came and swept everything that I owned. Luckily, I managed to run outside to safety.” (P28)

“The whole house fell apart, the water washed everything away. Even the houses next to mine. You could see beds and chairs floating in the water. Everything that I owned was lost, my furniture, my clothes and shoes, our groceries, everything. After all these years, my house was no more, I didn’t have a place to stay anymore.” (P4)

“I was cleaning the house when the floods came. My three boys...were also in the house. My sons and I were disturbed by the level of destruction. The water kept rising, the sofas and everything on the floor was damaged. We had to evacuate to the halls in case it got worse.” (P29)

“I was at home with my 3-year-old child...it was raining, and water started getting into the house through the roof and walls. That is when we all realised that this rain was not anything good. We panicked and quickly ran outside. Suddenly the house collapsed. The house was made of wood and brick, and I have stayed in the house for 21 years, that is, since birth.” (P30)

Many participants had to endure the trauma of watching their homes destroyed by the floodwaters. The situation which escalated rapidly, caused their furniture to become submerged or float in water and for household structures to collapse, reflecting the full wrath of the flood. The fact that the waters rose, with little warning, left many people in

danger, potentially creating anxiety, panic and chaos within flood-stricken communities. One of the participant's shared that the rainfall was so strong, that it affected the infrastructure of her wood and brick home, causing it to collapse. Her home which had withstood the elements for twenty-one years, collapsed suddenly reflecting the severity of the floods.

These findings cohered with those made in a study by Masese, Neyole and Ombachi (2016: 7) which documented the loss and damage, caused by flooding in a community, in Kenya. Osman, Ansah-Mensah, Amoah-Nuamah and Atanga (2023: 6) also explored the impact of the floods on informal settlements in Ghana. These researchers reported that not only were households damaged, but inhabitants had suffered loss of property, with many families being displaced during floods. A more recent study, in eThekweni, found that single mothers, were most affected during the KwaZulu-Natal floods in 2022 (Ajodhia and Makhanya 2024: 10). Given that these mothers were displaced, the need for effective disaster preparedness becomes more important. Collectively these studies reflect the intersection of natural disasters and the vulnerability of certain populations, which has both immediate and long-term consequences, that include mental health sequelae, displacement, and economic recovery. Moreover, these findings highlight the need for comprehensive policy interventions and community support initiatives, that will aid recovery and build community resilience against future flooding incidents.

As shared by the participants, the trauma of witnessing the destruction created by torrential rains and the flooding of their homes, which consequently threatened their lives and property, created deep enduring psychological effects. Campbell, Cheng, Svendsen, Kochnower, Bunting-Howarth and Wapnitsky (2021:4) who documented the lived experiences of a community in New York, made similar findings to that of the current study, saying that the chronic flooding had a deep social-emotional impact on this community, who struggled to adapt to these circumstances. According to Nöthling *et al.* (2023: 213), the intensity of the emotional trauma during these times, is influenced by factors such as the intensity of the threat, the duration of exposure, and the individual's prior experience of floods and coping mechanisms. Adler and Gutierrez (2022: 279) argued that those who were exposed to natural disasters such

as a flood, which threatens both personal safety and property, can present with acute stress reactions, which is characterized by intense feelings of fear, anxiety, and helplessness. Whilst this reaction is a normal response to a life-threatening situation, it can also be overwhelming and disorienting. Keya, Leela, Habib, Rashid, Bakthavatchalam and Habib (2023: 10) affirmed that threats to life and property, can further contribute to heightened states of anxiety and hypervigilance.

Mann, Marwaha and Torrico (2024: 6) asserted that prolonged exposure to distressing events, especially if it involves personal danger or destruction of one's property, can contribute to the development of post-traumatic stress disorder. Symptoms of post-traumatic stress disorder, which includes intrusive thoughts, flashbacks, nightmares, severe anxiety, and avoidance behaviours, requires mental health support. The trauma of being caught within the dangerous milieu of a natural disaster, can create enduring psychological scars that may affect their well-being, long after the disaster. Campbell and Renshaw (2018: 152) opined that those exposed to natural disasters, become overly alert to potential threats, experience constant worry and heightened levels of stress, well after the immediate danger has passed. This can disrupt a person's daily functioning, erode close relationships and other social interactions, causing considerable strain in interpersonal relationships. As such individuals may begin to experience difficulties in expressing their feelings, and their loved ones may struggle to understand or support their emotional needs because of this.

Whilst some of the participants were asleep with their families, especially their young children, when their homes began flooding, several participants were not at home. Those that returned, found that their homes and belongings had been washed away. They shared the distress, of finding that the floodwaters had ravaged their homes, and their communal spaces as follows:

"I was not at home and received a call that my house was flooded. I travelled the following day to my place, only to find water flowing like a river from behind my house, into the house. Everything was gone, the door, some of the walls, the furniture that was left was all smashed up on one side covered with mud. Nothing could be saved." (P22)

This experience reflects the shock of returning home to find everything destroyed. Water from a nearby river had entered the house and damaged the furniture and caused the house to become logged with mud. The shock of these losses inevitably caused deep psychological trauma. This was evidenced in other studies by Nöthling *et al.* (2023: 201) and Zhong *et al.* (2018: 167), which underscored the trauma linked to natural disasters. Atwoli, Platt, Williams, Stein and Koenen (2015: 1,4) further argued that witnessing trauma, particularly trauma linked to natural disasters increased the risks of mood and anxiety disorders amongst local populations.

These findings reflect several important issues, namely (i) that Early Warning Signs associated with weather forecasting were not well communicated, as people were caught unaware of the impending flood or (ii) Early Warning Signs had not communicated the intensity of the rainfall and potential flooding to communities and lastly (iii) very little lessons were drawn from previous flooding incidences. Hence flood resilience capacity plans including alertness and preparedness to evacuate based on existing disaster and risk management plans were non-existent or minimal. These findings suggest that despite the fact that the eThekweni area in KwaZulu-Natal, had been hit twice by floods and appears prone to flooding, the extent of flood resilience and disaster preparedness was still considerably low (Grab and Nash 2023: 11). There is therefore a need to enhance flood resilience capacity through strategies that seek to improve knowledge and education of what to do, dissemination and early warning management systems.

There is considerable agreement in the extant literature on disaster risk management and recovery that understanding the experiences and views of the affected people is critical and instrumental towards the development of high-impact interventions. This is because affected people are the source of first-hand information, that is reliable for framing interventions which address the genuine felt needs of communities (Baraldo and di Franco 2024: 1; Sadeghlou and Mikhak 2022: 11; Kato 2021: 5). Hence it is important that the voices of affected people be heard, and that they remain at the centre of disaster preparedness interventions.

4.6.1.2 Sub-theme 2: Housing structures and the impact

The second sub-theme that emerged from the data, related to the types of housing structures and the impact of the floods on these homes. Participants shared how their homes were affected, saying:

“My house was made of tin and bricks/stones but was a bit old and built in a low-lying area... Water just flooded the house through the door as the water level had risen. It started to crack and sink. My house is the first house to be severely damaged in my area.” (P2)

“I had a five roomed house made of tin...the full house was washed away with all that was in it.” (P9)

“I stayed in a shack for 6 years, although I stayed in the area for 54 years. I lost the house, which was washed away with all that I had.” (P10)

These narratives revealed the deep vulnerability of certain types of houses, which were rapidly affected because of their weak infrastructure. These narratives mirror the type of homes, within the broader context of homes in South Africa. One of the participant's homes which was made of tin, stones and bricks disintegrated quickly, with the force of the flood waters. The combination of poor building materials, poor construction, age of the home and the fact that it was in a low-lying area, increased its vulnerability to the flooding. The complete loss of homes within informal settlements, highlights the vulnerability of homes in informal settlements, because their homes are often built without the requisite structural integrity to withstand severe weather events.

The study areas, which included Crossmoor, Tongaat, and Lamontville, are characterized by homes, which are constructed from materials, which include primarily tin, timber, mud, poles, and bricks. One of the participants shared that her tin home could not withstand the impact of the floodwaters and was swept away, whilst another described the significant vulnerability of shack dwellings. She said despite living in the area for 54 years, her shack was destroyed. In Crossmoor and Tongaat, which were

the study sites, many homes were swept away, because the materials used in the construction of these homes was predominantly mud and wood. This coupled with the fact that these homes were often located in low-lying flood plains, enhanced their vulnerability to the impact of flooding. Conversely, homes in the Lamontville area, which were constructed primarily with bricks, suffered less severe damage. Only in some instances, were older structures impacted. Vidal (2024: 6) who conducted a study in the Philippines found that homes which were made from bamboo or makeshift and salvaged materials, were at greater risk to disasters, as these materials were less resistant to disasters such as floods, earthquakes and typhoons.

South Africa inherited a legacy of colonialism and apartheid, which led to the separation of race groups into different areas, thereby influencing housing and further entrenching poverty within such communities (Yesufu 2025: 11). Research by Turok (2015: 4) found that whilst many South African cities, had seen economic growth, this was not accompanied by proportional improvements in housing for the poor. Instead, urban growth led to the expansion of informal settlements, where inadequate housing and poor living conditions have become pervasive. Such poor housing conditions for a majority of the population, led to higher health risks, reduced educational outcomes, and limited economic participation, which collectively perpetuates the poverty experienced by these disadvantaged communities (Ampofo, Iddrisu, Arfasa, Mantey and Aniah 2024: 3; Pillay 2017:6). Dlamini *et al.* (2024: 11) further argued that informal settlements emerged in areas, that were not officially zoned for human settlement and hence were unable to tolerate natural disasters. In other areas, inhabitants with homes closer to floodplains were inevitably more vulnerable to flooding (Dlamini *et al.* 2024: 10).

The South African context therefore faces an acute housing emergency (Cinnamon and Noth 2023: 1). Turok (2015: 3) posited that the rise in urban population, has made it difficult to provide adequate housing and hence many informal dwelling or shacks have sprouted. Most of these shacks in informal settlements are constructed from second hand materials such as corrugated metal sheets, pieces of wood and mud (Anwana and Owajori 2023: 4). These homes are also not well insulated, and householders frequently use paraffin lamps and gas appliances for warmth and

cooking (Ndanduleni, Radebe and Huan 2023: 2; Brunsdon 2020: 2). Moreover, these informal settlements which are often built on land that was not authorised by the municipality, suffer from limited poor access to basic services and have inadequate storm water drainage systems, rendering them extremely vulnerable to environmental hazards such as flooding (Dlamini *et al.* 2024: 1; Cinnamon and Noth 2023: 1). To access water, many of these settlements also sprout next to streams and rivers which are prone to landslides and floods (Dlamini *et al.* 2024: 1). Due to the high volumes of those who live in these informal dwellings, many of these households become vulnerable to the hazards of adverse weather conditions.

Jewkes *et al.* (2023: 1) reported that the April 2022 floods, resulted in over 4000 homes being damaged or destroyed, the majority of which were in informal settlements. The residents within these settlements encountered even greater hardship due to their poverty and poorly constructed homes. Furthermore, most informal settlements develop on the sides of steep hills and ravines, increasing their vulnerability to flooding and landslides. These landslides have also been known to affect properties where there are retaining walls. Once they collapse and they cause homes to give way and disintegrate under the strain of the rubble (Jewkes *et al.* 2023:2-3). Internationally, studies have also shown that whilst informal housing is a necessity for people living with low income, such areas are more prone to flooding and landslides, because of poor-quality housing materials and proximity to rivers (García and Hernandez 2023: 5; Satterwaite, Archer, Colenbrander, Dodman, Hardoy, Mitlin and Patel 2020: 5).

Dlamini *et al.* (2024: 11) supported this notion saying that many informal settlements have emerged in areas, that were not officially zoned for human settlement, and they therefore cannot tolerate natural disasters. In other areas, inhabitants with homes closer to floodplains inevitably were more vulnerable to flooding (Dlamini *et al.* 2024: 10).

The damage caused to homes in informal settlements during the April 2022 floods in KwaZulu-Natal revealed the immense vulnerability of these communities to climate related disasters. Regions such as KwaZulu-Natal, however, demand intensive planning and research that can guide how the quality of certain dwellings in relation to

the context of their locations can act as a risk factor such families. Safety mechanisms that ensure that buildings are designed resiliently are crucial to minimizing future damage and safeguarding communities during floods. The emphasis on careful planning and inspection of materials selected, can mitigate the adverse impacts of flooding, contributing to the long-term sustainability of homes in vulnerable areas. This may also require sensitizing and educating communities to the consequences of poor building practices within areas prone to flooding.

Housing precarity and homelessness which ranges from insecure or inadequate housing to a total lack of shelter, predisposes the health of those within such contexts to chronic illness, physical exposure and stigmatization due to weather extremities (Kidd, Greco and McKenzie 2020: 4). There are considerable risks associated with living in informal settlements, as evidenced in a review conducted by Zerbo, Delgado and González (2020: 4) on the vulnerability of urban informal settlements in Sub-Saharan Africa. Their study described risks such as malnutrition, injury and accidents, mental health ailments and child mortality amongst the vulnerable populations residing in these settlements. Moreover, Mkhize, Mthembu and Napier (2023: 10) found that some of the challenges affecting the people living in an urban informal township in Umlazi, eThekweni, South Africa, included high unemployment rates and food insecurity. Over 67% of residents were found to be surviving on a highly restricted food budget. The added factor of natural disasters, with the potential to damage or destroy such households reflects how the socio-economic distress already confronting such families can be exacerbated.

The scholarly literature has in fact exemplified how such socio-economic vulnerabilities are influenced by natural disasters. Gurtner and King (2021: 493) for example argued that the inequality of vulnerability, stems from socio-economic inequality, location in hazard prone areas, fragile infrastructure and environmental changes. Factors such as socio-economic disadvantage, race and gender influence social vulnerability and climate related intersections. Otto, Reckien, Reyer, Marcus, Le Masson, Jones, Norton and Serdeczny (2017: 1652) concluded that impoverished and disadvantaged individuals globally, are more exposed to weather hazards, that impact food security

and health and threaten safety because of climate-linked social breakdown and migration.

Not only were some homes completely washed away, but some participants shared the type of damage and destruction they encountered as follows:

“My house was made of wood and brick...I was called to come back home... The roof had fallen and was inside the house.” (P34)

As evidenced the roof of this participants' home had given way and collapsed into the home, destroying household items. Another participant shared how her home had not only become waterlogged, but the mud that lodged itself within it, left her unable to move. Such resultant mud slides affected other people who required to be rescued urgently as they had become immobilised and consequently in danger.

“Find water flowing like a river from behind my house into the house through the open front door...The mud was unbearable when I tried to go inside the house so I couldn't move. There was also a neighbour who got stuck in the mud, and people got him out.” (P22)

Whilst these narratives reflect how those in vulnerable households were affected, those in urban areas were equally impacted. One of the participants, who lived in a brick-walled house in a developed area, reported that her home suffered substantial damage. The destruction of homes in urban areas, was also reported in various newspaper articles (Joubert 2023: para. 7 line 2; Myeni 2022: para. 3 line 2; Russel 2022: para. 5 line 1-3). The impact of flooding, on other types of houses has also been shared in the literature. Braimah, Abdul-Rahaman, Oppong-Sekyere, Momori, Abdul-Mohammed and Dordah (2014: 1) reported that in Sawaba, northern Ghana, the floods had led to the collapse of numerous household structures. Their study found that 96% of the mud houses had sustained cracks, with 76% of their sample reporting damage to the walls and 24% to the floors. In addition, some concrete homes, as in the current study experienced structural failures, with 68% indicating that their homes had sunk, due to mud slides whilst 10% encountered strip sinking. This phenomenon occurs when the ground level progressively lowers due to erosion by water, thereby placing

homes, even in well-developed areas at acute risk, as was experienced during the April 2022 floods. The aftermath of the floods in Sawaba, was equally similarly catastrophic, resulting in the collapse of 66% of homes, where 36% of the residents were either seriously injured or had lost their lives (Braimah *et al.* 2014: 5).

It is possible and likely that the distress linked to the damage and loss of homes was intensified by long standing economic pressure and unstable living conditions especially in the semi-rural area and informal settlement.

According to researchers such as Marvi (2020: 2), the extent of damage to residential buildings is influenced by both building characteristics and flood characteristics. Soetanto and Proverbs (2004: 4) identified key building characteristics that increase the risk of damage caused by floods, saying that the frequency of flooding experienced by a structure, the materials used in the construction of a home, the drying capabilities of these materials, and the condition of the building, prior to flooding can influence the type and extent of damage. The vulnerability of different types of houses to flooding was therefore evident, with informal settlements, suffering the most significant losses.

4.6.1.3 Sub-theme 3: Loss of belongings and documents

The third sub-theme that emerged in the data, related to the loss of belongings and documents. The narratives that follow provide a deep and poignant account of the loss of personal belongings and essential documents during the floods:

“I lost everything: furniture, food, TV, bed, blankets and clothes. I also lost all my documents, including my church ID.” (P2)

“The rains and floods made it easy for the water to enter through the ground, and some flowed through the door. I lost everything: food, TV, blankets, clothes, shoes and groceries.” (P26)

These narratives capture the extent of loss of important household furniture and belongings, that participants from all three areas experienced. The loss of property such as furniture, clothes, educational certificates and national identity documents was

a common thread within the data. There was also loss of essential items and the destruction of essential items such as bedding, clothes, and food and groceries. The loss of groceries was undeniably hardest felt, by those who were already experiencing socio-economic distress. The word 'lost everything' was voiced consistently within the data and conveyed powerfully the magnitude and depth of the losses experienced.

Other items such as photographs, clothing, books and other personal belongings, many with deep sentimental value, that was accrued throughout the participant's personal life journey and which had immense personal value were also lost. They reflected milestones in the participants' lives and captured important personal memories, linked to personal relationships at times. These losses can erode social and cultural connectedness through the loss of such items. Othman, Sharip, Kasim, Kamdari and Baharuddin (2022: 10) concurred with these sentiments, saying that affected individuals and families of flooding disasters, often feel depressed due to the loss of their belongings and sentimental items which were irreplaceable. The loss of other personal items such as one's church identity document capture how religious and spiritual affiliations were also disrupted.

Other researchers made similar findings. Osman *et al.* (2023: 2-4) for example conducted a study in the slum areas of Ghana, with a migrant community, that was characterized by high levels of poverty, a lack of insurance, inadequate housing and poor sanitation conditions. The area was also set on a floodplain. Like the current study, participants also lost their furniture, bedding, mattresses, fridges and electronic equipment. In another study, Owen, Kemp, van der Watt, Harris, Li Ern Ang and Marais (2024: 7-9) reported on the losses experienced by a community, following flooding caused by a burst dam. They found that entire households and the belongings of inhabitants were damaged or destroyed, including their furniture, bedding, clothes and phones. Masese *et al.* (2016: 7) surveyed households in the Nyando basin, in Kenya and found that many families had lost their belongings, particularly their furniture and electronic gadgets which were damaged during the floods. The loss of personal items was heightened within such impoverished households, as they have no financial resources, to replace same. These losses therefore perpetuate a vicious cycle of poverty for these communities (Masese *et al.* 2016: 9).

The loss of books and uniforms for children was also particularly difficult for the children within these households. Some of the participants lamented same as follows:

“When everything got washed away it was all our clothes. All the children’s school uniforms and shoes were damaged. Their shoes got lost. These things are so expensive and how am I going to get more.” (P3)

“I lost furniture, fridge, TV, food, radio, clothes and groceries. I also lost school uniforms and books for my two children.” (P9)

“It is so bad, all the schoolbooks have been destroyed and gone. My children are not going to be able to cope and the schools will be so mad at them. I am very worried. My child asked me ‘mama how can I go to school now?’ I had no answer.” (P17)

The loss of school uniforms and books was also found to be challenging, particularly in homes where parents struggled to purchase books and uniforms. Hence when school related items were lost, children’s ability to attend school was affected, thereby disrupting their academic journey, as parents lacked the financial resources to replace these items. These narratives are reflected in other empirical studies globally. A study conducted by Krishna, Ronan and Alisic (2018: 7) found that the loss of schoolbooks, uniforms and illness had thwarted children’s return to school. Similarly, a survey undertaken at sixty schools in Kenya, that were affected by floods, found that there was a significant decrease of students returning to school after the floods (Elimu Bora Working Group 2024: ii). The survey further established that parents had struggled to replace damaged and lost books, uniforms and other school necessities affecting their children’s return to school (Elimu Bora Working Group 2024: 11).

The distress linked to the loss of belongings could also have been shaped by poverty and limited economic reserves that had already constrained the households before the flood.

Other participants described the loss of essential health documents and medication, saying:

“There was no electricity... I managed to save my national identity document because it stays in my pocket. I also lost my hospital cards and medication. I am on chronic treatment of asthma.” (P 10)

The loss of hospital cards and medication exemplify the impact on health, especially where participants are dependent on chronic medication. In situations where people are dependent on government facilities for medication due to their financial circumstances, the loss of essential medicines becomes more acute as they are unable to immediately replace same. Kelly, Mitchell, Walker, Mears and Scholz (2023: 6) made similar findings in their study, as they found that there was a high prevalence of those affected by natural disasters, who had either lost essential medicines or had to endure an interruption to their supply of medicines. They found that those who were evacuated and displaced to other areas, following a disaster struggled to access crucial medication. This impacted their adherence to treatment (Quaill *et al.* 2019: 16). Waddell *et al.* (2021: 4) described other challenges which flood victims faced, such as the disruption to healthcare services. Those who lost their homes and belongings did not know where to access their medication, within the new environments they were displaced to. Jenkins, McCarthy, Kelen, Sauer and Kirsch (2009: 1) in particular described the dilemmas faced by those who were affected by Hurricane Katrina, saying that 48 % of those who were relocated to shelters, could not access their chronic medication.

Other participants reported the loss of essential documents such as identity documents and birth certificates saying:

“The floods washed away everything that I had. I lost my national identity documents, phone, bed radio, clothes, food, and groceries. I also lost my mother’s national identity document. Almost all shacks in this area were destroyed, and everyone lost their belongings.” (P8)

“I lost my national identity document and my child’s birth certificate.” (P30)

Several participants were deeply concerned over their loss of personal documents, particularly identity-related documents, such as national identity cards and birth certificates, which are crucial for various issues such as employment, schooling and access to social and healthcare. These documents represent more than just administrative records, but are crucial to social identity, access to services, and legal standing and are often very difficult to replace within the South African context. In South Africa, the loss of national identity documents impact access to government services, financial aid, and other forms of social support. Birth certificates and other identity documents are required for legal processes, such as property claims, inheritance, and the establishment of legal relationships. Hence the loss of same, can result in legal complications and difficulties in asserting rights or accessing services, further hampering opportunities to access educational institutions or employment opportunities. These documents are critical for job applications, and professional certifications and can interfere with the personal pursuit of academic or career goals.

Some of the affected people however managed to safeguard their documents saying:

“Apart from my house, which was severely damaged, I also lost my furniture, food, clothes and some important documents. My family lost all its belongings except educational qualifications and national identity documents.” (P25)

This narrative suggests that because their personal documents were important within their personal lives, they went to great lengths to safeguard them from physical damage or theft. The data also provided rich insights into the use of domestic properties. It emerged from the narratives, that some of the houses were used as a source of income to create rentals or business outlets. Hence the damage to these properties, affected the livelihoods of families, who depended on income from these houses. One of the participant’s described this as follows:

“I had a five-room house made of tin. I used to rent out 3 rooms and use the other two rooms. The full house was washed away with all that was in it.” (P9)

This narrative reflects that this family was dependent on the rental generated from their home. It entrenches the need to frame and design social safety nets to help mitigate losses within these situations. Similar findings were made by John (2020: 9), who found that the floods had adversely affected households, due to the loss of rentals, as the homes of tenants were destroyed. Moreover, those renting properties had therefore opted to move to other areas, which did not have the risk of flooding.

Other participants similarly shared:

“My house was made of wood and brick and had a tuck shop for my small business, selling groceries.... The roof had fallen and was inside the house.”
(P34)

“I was operating a small tuck shop for small business, and I was also working as a caretaker at a school. I lost my tuck shop and my work. I have no other means to cope.” (P3)

These narratives reflect that several households were dependent on small businesses as a source of income. Given the context of poverty within which these businesses operate, they were crucial to supporting particularly, those who were unemployed, single mothers and the elderly. The loss of income from these small businesses would undeniably have affected these business owners to support their families. A study conducted by Thwala, Masiya and Lubinga (2023: 11) in informal townships in Cape Town, South Africa, found that businesses in informal townships had contributed positively to the economic welfare of the area through income generation, providing a source of employment and business entrepreneurship. This was supported by Hogg (2020: 1) who stated that the food business in the informal sector was estimated to be worth R87 billion, which consequently contributed significantly to the economy.

In other situations, participants used their homes to run income generating businesses. The loss of business-related equipment within the floods, undeniably impacted their livelihoods as follows:

“I lost my business equipment, and my garage was severely damaged. The path to the garage was damaged and I cannot access it.” (P6)

Etim and Daramola (2020: 1) argued that the informal sector represents a key component of economic growth in several sub-Saharan African countries. Jean-Baptiste, Olivotto, Porio, Kombe, Yulo-Loyzaga, Gencer, Leone, Lucon and Natty (2018: 404) added that most informal settlements, draw their livelihoods from informal income. A survey conducted by the Department of Trade, Industry and Competition, reported that at least 826 companies were affected by the April 2022 floods in KwaZulu-Natal, resulting in a loss of an estimated seven billion rands. Not only were large businesses affected, but also small, micro and medium enterprises such as spaza shops and tuckshops in informal settlements. This caused the government to implement measures to assist their recovery (South African Government 2022b).

Evidence of the economic effects of floods, was evidenced in other studies as well. Veeravali, Chereni, Sliuzas, Flacke and Maarseveen (2022: 8) who conducted a study in Uganda, on the factors influencing flood damage mitigation among micro and small businesses, found that many businesses had reported that relocation had been a costly exercise. These sentiments were echoed within the feelings of hopelessness shared by participants in the current study. For example, participant three had shared that he had no other means to cope financially.

4.6.1.4 Sub-theme 4: Vulnerable households

The fourth sub-theme to emerge under the first theme, related to vulnerable households. Participants shared the vulnerability they faced, in terms of the location and structure of the household, saying:

“My house is near the river... I could not bear the presence of water coming from the flooded river into our house.” (P1)

“My house was quite close to the river. I had observed that the river was flooding. When the river flooded and water started entering my five-roomed

house, I took my children and ran far away from the river and the house leaving everything behind.” (P9)

These narratives reflect the heightened vulnerability of households, which were in close proximity to a river, a factor which increased their danger linked to floods. Two of the participants, shared that because their homes were near the river, the excess rainwater had rapidly flooded their homes. In line with this sub-theme Aksha *et al.* (2018:103) described vulnerability as physical, social, economic and environmental factors or processes, which increase the exposure of an individual, a community, property or systems to the impact of a natural hazard. These factors therefore influence the capacity to prepare, anticipate, respond, manage and recover from natural hazards, as in the case of the current study, where those who lived close to a river had little time to flee. According to Aksha *et al.* (2018:103), whilst vulnerability affects people to varying degrees, poorer socio-economic communities, tend to be most affected by natural hazards, because of their inability to prepare for any potential for harm.

Anwana and Owojori (2023: 1) concurred, arguing that because those from impoverished circumstances are forced to live in risky areas, such as floodplains and informal settlements, they are more vulnerable to the effects of flooding. James (2023: 1) in his article on the effects of climate change on informal settlements, opined that because the physical surroundings in most metropolitan areas, especially in townships and informal settlements are neglected and are characterized by inadequate planning, design and management, they have restricted access to essential services making them more vulnerable to disasters.

Within the current study, the homes of many of the participants, were located within floodplains, which are naturally prone to flooding, because they are low-lying. While floodplains are by their nature able to absorb excess water, developments that encroach upon them, increase the risk of damage (Hino, Jordan, Nikhil, Antonia and Sweeney 2024: 1; Han, Huang, He, Fang, Wen, Gao and Du 2020: 2). For example, in the Crossmoor area, most of the homes of participants were built near riverbanks resulting in them becoming easily flooded.

The data further found that many of the households, in the study were child headed households or grandmother headed households, or where there was only a single parent. Those heading such households were either dependent on a State Grant or engaged in part-time jobs, which brought meagre salaries. This made it impossible for them to have insurance for themselves or their properties, which complicated their recovery when adversities arose. Such situations result in poverty being both a driver and a consequence of disaster risk. Because certain households, such as those in the current study, were too poor to insulate themselves against risk, once affected, their poverty perpetuated a slower recovery from the impact of natural disasters. Hence disasters like floods, can impact various segments of society differently, with the most vulnerable groups, bearing the brunt of its effects. The plight of such households is evidenced within the narratives that follow:

“I am single, and I have two kids aged 13 years and 9 years old. The floods which caused me to lose my job ...I have great fear of how I will look after my two children.” (P8)

“I am 54 years old and single. I live with my two sons and a grandson. During floods, I was working as a domestic worker and after the floods I lost my job. I am so stressed and depressed; I don’t know how I will look after myself and my children.” (P20)

These narratives capture the acute economic vulnerability of certain households. Single parents bear the substantial responsibility, of providing for the physical needs of their children or other dependents. Another single parent said:

“I am 62 years old, single and a pensioner. I also have two children who are 16 years and 10 years old. Both my children are still in school. I receive R2000 pension every month and with this loss I do not know how I will survive.” (P26)

What was clear from these narratives was the economic vulnerability of households, where families were reliant on a single source of income, thus making them more susceptible to financial instability. Single headed households also experience limited

social support in comparison to dual-parent households, which can further heighten their feelings of isolation and vulnerability, particularly after a disaster (Rees, Beeber, Sampson and Lietz 2023: 2; Stack and Meredith 2017: 3). As one of the participants shared, they experienced significant anxiety related to how they would cope. This underscored their feelings of being unsupported as they navigated their new and difficult circumstances.

Dinh, Tan, Tinh, Ha, Kien, Hung, Linh and Phuong (2023: 12) supported these findings, saying that single parenthood was a significant factor in increasing vulnerability, to post flood mental health sequelae. Shah, Ye, Shaw, Ullah and Ali (2020: 4) however reported that family size acted as an important element, that influenced social vulnerability and could affect a household's adaptive capacity to manage disaster risks positively or negatively. Their study found that larger families were more vulnerable to the risks associated with disasters, as they had increased financial burdens.

In addition to age-related vulnerabilities, health status also contributed to the vulnerability of a household caught within the milieu of a flood. One of the participants shared:

“I am 60 years old and single mother who looks after 3 children. I am also sick and have problems of high blood pressure. I was working as a maid, and I lost my job after the floods. I was very stressed and have flashback of the rains I lost my work because I was staying in the hall for so long and couldn't go to work. My family gave me some money for food.” (P29)

This narrative reflects the struggles of one of the elderly participants with hypertension. Not only did she lose her job, which affected her ability to care for her children, but her stress was further exacerbated, by the fact that she had to live at the flood shelter, for a protracted period. Shah *et al.* (2020: 2) concurred saying that those with chronic illnesses and poor health struggle more in the aftermath of a flood.

This theme highlighted the multiple ways in which flood victims experienced hardship and suffering, post the April 2022 floods in eThekweni. This theme reflects the interconnectedness between physical, psychological and economic vulnerabilities, which collectively perpetuated a cycle of deep hardship, particularly for families in informal settlements, townships, single parent households, the elderly, and individuals with health issues. The loss of livelihood, combined with physical damage to homes, left many of the participants feeling helpless and dependent on social networks for their survival.

4.6.1.5 Sub-theme 5: Impact on community infrastructure and utilities

Sub-theme five focused on the impact on community infrastructure and the challenges participants experienced, to access essential services. The narratives that follow reflect damage to essential infrastructure and its effects on the community members:

“There was no electricity... the poles were damaged...Many people were affected. Houses were floating in this area.” (P10)

“Other houses in the community were washed away, and they lost everything they had...even the sewer pipes were damaged.” (P30)

The loss of electricity in flood devastated areas, reflect how natural disasters can damage the power infrastructure. Electricity and energy are essential, within any household to meet physical needs and for ensuring good health. According to Jessel, Sawyer and Hernández (2019: 1) its absence has the potential to create many adverse effects, especially for impoverished communities. A review by Casey, Fukurai, Hernández, Balsari and Kiang (2020: 371) described the impact of electricity outages during and after a natural disaster, saying that some of health effects which were documented, included cardiovascular, renal and respiratory diseases, gastrointestinal illnesses and temperature related illnesses.

One of the participants reported that the floods caused widespread damage to community infrastructure. They shared that “houses were floating,” which suggests

that the volume and strength of the flood waters, were strong enough to uproot residential infrastructures and sweep them away. In addition to creating power outages, the sewer system, also suffered damage. Naidoo, Nzimande and Morris (2023: 2) wrote that one of the common causes of sewage spillage after heavy rains and flooding, was linked to the strain on the infrastructure and sewage system, which resulted in wastewater overflowing into rivers and oceans. This was particularly true of eThekweni where the river and ocean waters became contaminated, creating considerable public health issues, that led to the closure of several beaches.

Flooding often leads to the contamination of water sources with sewage. Ahern *et al.* (2005: 3), reported from their study, that the sewerage system had failed after the floods and had contributed to the spread of waterborne diseases, particularly in densely populated urban areas with poor sanitation. This is particularly relevant in low-income areas, such as in the current study, where there may be inadequate drainage systems to cope with heavy rainfall. The collapse of the sewage systems, as detailed in their study, led to untreated wastewater being exposed to the environment, posing immediate risks to public health. and destroying basic sanitation services. This inevitably would have had severe health and environmental consequences for these communities, increasing the potential for disease outbreaks.

Other researchers such as Karagiannis *et al.* (2017: 24) also reported from their study of twenty floods, that heavy rainfall or hurricanes, had caused electricity supplies in all the areas studied. Moreover, power was restored very gradually in these areas meaning that many households had limited access to electricity to cook or power up any electrical equipment. Kayaga, Amankwaa, Gough, Wilby, Abarike, Codjoe, Kasei, Nabilse, Yankson and Mensah (2020: 145) further supported these findings, saying that in low-income urban settlements in Ghana, electricity supplies were frequently disrupted during the floods. More importantly however their study found that although the heavy rains and winds had caused electrical poles and conductors to be damaged, the electrical companies had also disconnected the supply during these times. This left people to turn to using solar charged lamps or paraffin lanterns and candles, which increased the risks of hazards from fires (Kayaga *et al.* 2020: 145). Moreover, whilst the use of alternative lighting solutions such as solar powered lamps or candles can

provide temporary relief, these alternatives may not support critical infrastructure which needs pumping systems for water and sanitation or communication networks, that are essential within these community spaces.

Gannon, Conway, Pardoe, Ndiyoi, Batisani, Odada, Olago, Opere, Kgosietsile and Nyambe (2018: 6) reported that in sub-Saharan Africa, multiple small businesses had to close or halt their activities, not only because of the electricity disruptions, during the floods, but also due to the lack of water, closure of transportation services and changes in demand. Hattingh (2022: 2) argued that the April 2022 floods in eThekweni resulted in more than 100 electrical substations being flooded, causing widespread darkness across many areas of the metropolitan. Moreover, the floods caused massive damages to other infrastructure. Bridges and roads were washed away and, water pipelines were damaged causing the water supply to be cut off, including water treatment works. This problem persists to date in the Tongaat community, where most of the community have no access to clean water.

According to Mishra and Mazumdar (2014 :314) natural disasters not only cause injury, damage to property, loss of livelihoods and life and disruptions to essential services but also substantial mental health sequelae. Keya *et al.* (2023: 10) identified the connection between disasters and a deterioration in mental health, saying that psychological morbidity was exacerbated by displacement and disruptions to essential services during flood events.

The impact of the floods on the community infrastructure and utilities, however extended well beyond the immediate damage to physical assets. As reflected within the narratives, the loss of electricity and collapse of the sanitation systems, had substantial consequences for the health and well-being of many communities.

4.6.2 Theme 2: Impact on physical health

The second theme that emerged from the data related to the physical effects of the floods on the participants. Two sub-themes namely: (i) personal physical injuries and

(ii) impact on chronic health conditions, were interlinked to the second theme on the impact on physical health.

The first sub-theme which focussed on physical injuries, is discussed in the sub-section that follows.

4.6.2.1 Sub-theme 1: Physical injuries related to the floods

Several participants, from all three study areas, shared that they were injured during the floods as follows:

“I was walking through all the mud in the rain. The pathway was filled of broken shacks, iron, sharp metal. I got cut on my foot and leg, but I had to carry on. Later on, I realised I was cut so badly. I was shaking so much. My sister washed the blood and bandaged it with cloth because it was the middle of the night.”
(P14)

“While trying to escape the flooding in the house, I slipped and fell on a tree that had fallen. I hurt my leg, my right hand and face.” (P18)

These narratives reflect how the participants were injured, as they attempted to flee from the flood sites. Debris that had moved and accumulated in unsafe ways, also included sharp pieces of metal, which left one of the participants with a deep cut. The loss of blood and cold, left him in need of immediate medical treatment, but because it was late night he couldn't access emergency care. Lee *et al.* (2020: 6) in their global review of water related disasters, reported that many of the injuries of the victims, occurred after a flooding event. Other studies documented the presence of injuries such as sprains, lacerations and fractures amongst flood victims (Burton *et al.* 2016: 238; Bich *et al.* 2011: 6).

A study conducted after the 2008 floods in Vietnam, which surveyed over eight hundred and seventy households, in the month following the disaster, found that many participants had reported similar injuries, such as cuts and bruises, which had resulted from falls (Bich *et al.* 2011: 7). Acute physical injuries were however fewer and less

severe amongst the participants and consisted typically of sprains and fractures (Bich *et al.* 2011: 7). Although no serious physical injuries were reported by the current participants, one cannot conclude that injuries during floods, are any less severe than physical injuries, sustained during other natural disasters such as tsunamis, hurricanes or cyclones. This notion is supported in other studies such as those by Bushong and Welch (2023: 7) and Hanchey (2021: 1385), who reported that direct deaths, due to a hurricane were due to storm surges which caused water levels to rise in homes and homes to be swept away by the water and mudslides. In these events drowning was more common, which can even occur during heavy flooding, as in the current study.

Another participant shared that they had to receive treatment for bronchitis as exposure to the cold and rain, had resulted in them feeling feverish and ill. They said:

“I got wet in the rain during the day and could feel I was getting sick. When it started flooding in the middle of the night and I was trying to escape. It was pouring with rain, that actually hurt the body. The next morning in the hall I got sicker and more had a fever and coughing. When I went to the clinic after two days, they gave me antibiotics for bronchitis.” (P25)

Acute respiratory illnesses have been reported as common epidemics following natural disasters, such as during the 2004 Indian Ocean and 2011 Great East Japan tsunamis (Mavrouli, Mavroulis, Lekkas and Tsakris 2021: 8). Respiratory illnesses were especially prevalent in evacuation centres. Other common causes of injuries included abrasions, lacerations and cuts caused by slipping and falling over debris (Frasqueri-Quintana *et al.* 2019: 63). Researchers such as Waddell *et al.* (2021: 7), reported in their review of the health effects of hurricanes, that many people suffered injuries from the force of the wind, damaged infrastructure and flooding. In addition to injuries drowning and electrocution was also common.

Participants also reported seeing people being washed away and heard that several members of their community, had passed on. They described the trauma of these experiences saying:

“I heard screaming of other people. It was dark and the rain was so heavy. I think I saw people being swept away. There was nothing we could do except try to escape.” (P1)

“A lot of people drowned, even children.... I never saw something like this.” (P8)

The experience of watching people drown, without being able to help them, was very traumatic for the participants. This undeniably will lead to considerable levels of post-traumatic stress, amongst the sample which will require mental health support for them.

4.6.2.2 Sub-theme 2: Chronic health conditions

A few participants reported that the chronic health conditions that they had, had worsened post the floods. They shared this as follows:

“Everything was not working out for me and making my health worse. Getting wet for so long in the rain made my asthma come back. I didn’t have my pump but in the night one of the people helping brought one for me. I thanked God. It is very scary because if I went to the hospital I would have died because they were so busy.” (P10)

“I thought I was going to die when the floods happened. My heart was beating faster, and I couldn’t think straight. I have high blood pressure and stress makes it worse. But I was thinking about my children and trying to stay calm. What was worse was I didn’t have medicine when I was in the hall. My head used to hurt, and I didn’t know the name of my medicines. After a week the mobile clinic gave me some different medicines for my blood pressure.” (P29)

“I panicked and never received any medical attention. I was afraid of my mother, who suffers from high blood pressure. Actually, during floods, the blood pressure shot up, and she was hospitalized at Wentworth. The doctors said it

was stress, and she needs to take her medicine. I was so stressed and worried because she was having chest pain and only saying her head hurts.” (P31)

These narratives reflect how the trauma of the floods exacerbated pre-existing chronic health conditions, amongst certain members of the community. Hypertension in particular, seems to have escalated due to the stress linked to the loss of their homes and belongings. One of the participants also reported that her asthma flared up and that even within the safety of the halls, they still remained in a dangerous space, as there was no immediate access to chronic medication and crucial medical help. These reports from the participants indicate that their health challenges were also influenced by poor health care and long term health challenges intensified by poverty and difficult living conditions. This was well noted in the analysis.

Habibisaravi *et al.* (2022: 1) concurred with the findings made in the present study, saying that flooding events, caused flares in hypertension amongst those who were affected by disasters. They further reported that there were positive correlations between the levels of anxiety, loss of property, finances and interruptions in the use of medication causing those with hypertension to become more ill (Habibisaravi *et al.* 2022: 1). Hence natural disasters can influence the outcomes of chronic health conditions significantly, particularly if there is non-compliance with medication and a lack of access to health services (National Institute of Communicable Diseases 2022: 18). Yamaoka-Tojo and Tojo (2024: 1) further reported that natural disasters such as floods and earthquakes exacerbate stress related to cardiovascular diseases such as cardiomyopathy and increased hypertension. In fact, the risks of developing strokes, acute myocardial infarction, arrhythmia and sudden cardiac death, was found to increase significantly and persist for several months after a disaster, which suggests the impact such events have on the health of its victims (Narita, Hoshide and Kario 2021: 1537). In a study related to the Great East Japan Earthquake, researchers explored the link between out of hospital cardiac arrests and found that the risk of cardiac arrests had increased significantly, in the first four weeks post the earthquake, amongst the 6700 adults in the affected region (Kitamura 2013: 2165).

Hassan, Nguyen, Buchanan, Grimshaw, Adams, Hassell, Ragster and Nunez-Smith (2020: 2139) in their review of the management of chronic non-communicable

diseases, found that difficulty in accessing medicines and acute care, had affected the health of people in the Caribbean, who had to rely on volunteers to assist them after a hurricane. A study conducted by Issa, Ramadugu, Mulay, Hamilton, Siegel, Harrison, Campbell, Blackmore, Bayleyegn and Boehmer (2018: 829) on deaths related to Hurricane Irma, that had affected Florida, Georgia, and North Carolina in the United States of America, determined that the most indirect common causes of death was the worsening of existing medical condition, with 18 % of deaths, attributed to chronic health conditions such as cardiac disease and stress related symptoms. A similar study conducted by Cruz-Cano and Mead (2019: 1051) on the causes of excess deaths in Puerto Rico following Hurricane Maria, discovered that most of the excess deaths, were caused by chronic conditions such as heart disease and Alzheimer's disease.

In addition to the physical consequences related to the health of participants and loved ones, the broader mental health effects were found to be profound. Theme three which follows, focusses on the mental health sequelae, experienced by the participants.

4.6.3 Theme 3: Mental Health Sequelae

The emotional distress and mental health effects of the floods emerged as the third theme in this study. Four sub-themes were interlinked, with this theme namely: (i) acute fear and anxiety, (ii) fear, (iii) sleep disturbances caused by traumatic flashbacks, and (iv) sadness and depression.

The first sub-theme which focused on the stress and anxiety experienced by the participants is discussed in the sub-theme that follows.

4.6.3.1 Sub-theme 1: Acute fear and anxiety

Participants from all three study sites, shared experiencing deep fear and anxiety as follows:

“When I think about that night, I am filled with anxiety again, my heart beats faster and I start to sweat. All I can think about is that night and asking my child to escape. I really thought we were going to die.” (P1)

“The floods caused me much anxiety, and sometimes, when I sleep, I have nightmares. Any rain now causes me to be afraid. I almost felt I would die inside my house when the water was flooding, and I could not help myself and my child. I can say that the floods caused me permanent fear and mental health problems. Sometimes, I have flashes that I did not have before the floods.” (P3)

“I am stressed and anxious. I cannot forget that day. It was like a nightmare. Hearing the people screaming for help and losing everything.” (P7)

“I was stressed then, and even now, I worry about the future because I am no longer employed.” (P20)

“I didn’t know if we were going to be saved. I prayed the whole time. When the rains didn’t stop and we heard that the houses were getting washed away, I was so uneasy and nervous. I couldn’t stop shaking.” (P11)

These narratives reflect the deep fear that participants experienced during the floods, particularly their fear of drowning or getting washed away. One of the participants shared that when her house began flooding, she thought she and her child would die, causing her to have recurring flashbacks of the experience. Her inability to help herself and her child caused considerable anxiety that has endured, post the incident. Other participants echoed their experiences of trauma, which lingered from their recollections of people who were desperately calling for help. Witnessing homes getting washed away, created such deep emotional distress, that participants had started shaking uncontrollably.

These experiences followed by job losses and the economic insecurity that came with same, further intensified the anxiety of participants regarding their plight. Others

described the stress of having to abandon their homes and flee to safety. This was described as follows:

“I nearly lost my daughter. It was raining. I was carrying her on my back...she was freezing. When I came to my sister’s house, she was wet and shaking. I was stressed” (P14)

This narrative captures how children were affected by the rain and cold. This mother shared how she had to flee to her sister’s home in the rain, and that her child had become hypothermic, whilst she attempted to reach safety. A study by Zenker *et al.* (2024: 7), similarly found that over 68% of individuals, affected by the 2021 floods in Germany, presented with enduring elevated levels of post-traumatic stress disorder, a year post the disaster. Asim *et al.* (2022: 11), who conducted a survey of post-traumatic stress disorder on flood affected people in Kerala, India also reported that female flood survivors, had experienced higher levels of anxiety than men.

In South Africa, a study of women residing in low-income settings found that these women had suffered excessive levels of stress and anxiety after the flooding event (Nöthling *et al.* 2023: 210). The study further found that the loss of infrastructure, homes, electricity cuts and access to fresh food were predictors of stress and anxiety amongst the victims (Nöthling *et al.* 2023: 212). This coheres with findings in the current study, where those who lived in the lower socio-economic areas of Tongaat, Crossmoor and Lamontville had reported a combination of stress, anxiety and depression, because of their loss of furniture, groceries, clothes, personal documents and in some instances their entire home.

Leichenko and Silva (2014: 546), contended that climate change has adverse effects on mental health, due to personal experiences of loss or injury from extreme weather events and through stress and anxiety over potential future events. A systematic review conducted by Golitaleb *et al.* (2022: 6), on the psychological effects of flooding on survivors, found that those whose homes were flooded while they were asleep, endured heightened stress and trauma. These authors opined that the suddenness of the disaster, contributed to long-term mental health issues, particularly post-traumatic

stress disorder. Hilditch, Dorrian and Banks (2016: 528) further argued that those who were asleep, were delayed in terms of alertness and response to any threat. Hence those who were unaware of the rising water, were unable to promptly activate early warning systems or seek help, thereby preventing rapid rescue and recovery operations. This was corroborated in several other studies, which indicate that those whose homes began flooding whilst they were asleep, presented with severe post-traumatic stress disorder, post the flood (Kim and Lee 2021: 6). Aronson (2008: 858) added that experiencing a disaster, whilst one was asleep could also create cognitive dissonance, where individual's expectations of safety are abruptly shattered.

A more recent study with fifty-three adolescents placed in shelters, after the 2022 floods in Bangladesh, found a disturbing prevalence of mental health problems. This included depression, psychological distress and post-traumatic stress amongst this cohort (Siddik, Munmun, Ahmed, Nabil and Mubin 2024: 61). In particular, 60.72% of the boys were affected by post-traumatic stress disorder, whilst 71.42 % experienced depression. A greater percentage of the girls in the sample presented with post-traumatic stress disorder (80%) whilst 84 % were found to be depressed (Siddik *et al.* 2024: 64). Several earlier studies also documented the mental health impact of floods on adults, who began presenting with post-traumatic stress disorder (Fredman, Monson, Schumm, Adair, Taft and Resick 2010: 5); anxiety (van der Velden, Kleber, Fournier, Grievink, Drogendijk and Gersons 2007: 40), depression (Apisarnthanarak, Khawcharoenporn, Woeltje and Warren 2012: 952), suicidal ideation (De Leo, Too, Kólves, Milner and Ide 2013: 173) and emotional distress (Wind and Komproe 2012: 1718), post the disaster.

The inability to reconcile the disaster with prior beliefs regarding safety and control over personal lives, led to persistent and distressing cognitive distortions, which contributed to post traumatic stress disorder (Zenker *et al.* 2024: 12). These findings further support those made by Graham, White, Cotton and McManus (2019: 7), who surveyed people in the United Kingdom from 2014 to 2015. They found that those people who had experienced a storm event and damages to property from the storm, were more susceptible to experiencing a chronic mental disease (Graham *et al.* 2019: 9).

This theme highlighted the intricacies between housing conditions, flood vulnerability, and mental health outcomes, emphasizing the need for targeted mental health support for those experiencing emotional distress, in the aftermath of such disasters. The findings reflect the plight of marginalised communities, who are often pushed to the peripheries of towns and cities into low-lying areas, which increases their vulnerability to flooding. This supports the need to address the structural and systemic factors that marginalize certain social groups of the community, so that there can be change related to their circumstances.

The sub-theme that follows focuses on fear.

4.6.3.2 Sub-theme 2: Fear

Participants described the deep fear they encountered during the floods, saying:

“I felt petrified and shocked to wake up to see the whole room covered by mud. The flood was too much, and I thought I would die.” (P24)

“I was very scared because people were dying...I didn’t want to die, I am still young and I have children.” (P17)

“You can’t imagine the fear of a mother. I was never so afraid as that day. God gave me strength to fight my fear and carry my child through the rain and the mud. I couldn’t see, because of my fear and the rain in my face.” (P14)

“I can’t swim and my children can’t swim. I was so afraid. People can die like this we all know it. My heart was beating. The mud was coming in fast, we were going to get trapped if we didn’t leave. But it was pouring with rain. I heard people shouting for everyone to run.” (P23)

These narratives reflect the deep fear that had gripped those within the milieu of the flood. One participant was overwhelmed with fear because the mudslide, had created a dangerous situation within their home, which could have caused them to become

seriously injured or lose their life. Another participant became aware that those in close proximity to them were dying. They were fearful that they would become trapped or unable to swim to safety.

These fears however reflect the broader context of the disaster, and the substantial dangers related to the loss of life, was becoming more tangible. Many participants feared losing their children, who were most vulnerable, as they could not physically withstand the impact of the rapidly developing rainwater. They shared this as follows:

“I was traumatized, and I feared that my child might be washed away by the rains. The image of the house falling is still fresh in my mind and sometimes I have flashbacks.” (P11)

“I had a great fear of losing my child and family. I care too much for my family since my siblings are very close. I could not sleep due to stress. Even now, I am still stressed and cannot sleep well. I lost my appetite, and I was depressed.” (P30)

The trauma experienced by participants was also linked to deep fear that they could lose their entire families. This led to insomnia, depression and other related symptoms such as the loss of appetite. These symptoms are characteristic of posttraumatic stress disorder, which lingered on, even after the event was over. This is a common psychological response, where an individual remains hyper-vigilant and fearful, long after a traumatic event has ended.

The excerpt that follows, reflects how the rain continues to act as a trigger in the present prompting heightened fear and anxiety:

“The noise of the rain was scary ... now whenever I hear rain I am scared.” (P22)

Mehring, Geoghegan, Cloke and Clark (2023: 5) concurred saying that participants, in their study in England continued to experience deep ‘fear of rain,’ which triggered significant levels of anxiety post the flooding experience. Zenker *et al.* (2024: 8)

similarly opined that traumatic events such as floods, created intense fears amongst those affected who believed that such experiences would recur. Heanoy and Brown (2024: 12) further supported this notion, arguing that fear and uncertainty were widespread reactions to natural disasters, which contribute to raised stress responses.

These narratives capture the deep sense of fear felt by the participants, which served to perpetuate their trauma. Due to this heightened fear and anxiety, many participants began experiencing flashbacks and sleep disturbances. This will be discussed under sub-theme three which follows.

4.6.3.3 Sub-theme 3: Sleep disturbances and flashbacks

Sleep disturbances emerged as the third sub-theme in the data. Many participants shared that they also experienced flashbacks of their experience as follows:

“Even when it rains now, I am now afraid of the rains. I am not sleeping at night; I am always awake due to stress and fear. I lost a good amount of money which I had kept in the house and that stresses me very much.” (P10)

“It was so painful My 3-year-old son was very shocked and has developed difficulties in sleeping. I was stressed and I missed my medical treatments. I am emotionally drained because I lost everything that I had. Sometimes I sleep, sometimes I spend the whole night awake.” (P11)

“I cannot sleep well... The fear of almost losing my child was too unbearable, and I suffered from flashbacks. I was scared and sad at the same time. The floods traumatized me.” (P30)

The deep fear amongst participants led to several other problems. One participant shared that she was "always awake due to stress and fear." This signals a hyperarousal state which is characteristic of posttraumatic stress disorder. Her trauma emerged not only from her fear that another flood could occur without warning, but that she could lose her savings, which she had safeguarded at home. Another participant

who almost lost her child, said that she experienced enduring levels of trauma. Another described the floods as a painful experience, that had led her to miss important medical appointments, as she attempted to work through the emotional sequelae of the experience. Not only were adults deeply affected, but one of the participants shared, that her three-year-old was equally traumatized by the experience.

Zenker *et al.* (2024: 14) made similar findings in their study, saying that more than 70% of their cohort had reported sleep disturbances and a lack of enjoyment in leisure activities, post the flood. Other researchers similarly reported finding that children were also presenting with sleep disturbances and symptoms of trauma. Shah *et al.* (2020: 6) noted the vulnerability of school children in disaster hit rural communities, which were flooded in Pakistan, saying that their study had found that children aged 5 to 12 years, were more likely to suffer with sleep disturbances, have difficulties falling off to sleep and had difficulties in staying awake during the day. Local media reports related to the April 2022 floods, further corroborated the findings in the current study, as many local residents, shared experiencing painful flashbacks of the flood experience, which had left them struggling to sleep (Makhaye 2022: para. 7 line 1-3; Mkhwanazi and Guy 2022: para. 1 line 1-2).

These narratives collectively reflect the psychological sequelae of the trauma of the floods, which extended beyond immediate emotional distress, to include chronic sleep disturbances and posttraumatic stress disorder.

4.6.3.4 Sub-theme 4: Sadness and depression

The fourth sub-theme that emerged under theme three, related to feelings of sadness and depression amongst the participants. They described this as follows:

“I was so stressed, sad and feared for my life and my two children. I had to take my two children who were terrified and scared to my neighbour. The floods came a week after I have buried my aunt, thus the stress and depression were huge. I lost appetite and I could not sleep well.” (P5)

“I am just so sad and depressed all the time.” (P18)

“I was depressed... very angry and could not eat. I was scared and sad at the same time. I cried a lot just like a child, whenever my mind takes me to the day of the floods.” (P32)

These narratives suggest that participants experienced lingering feelings of sadness which led to depression. This was due to them having to abandon their family homes and face the loss of what represented their family. Others who just had a bereavement, were left contemplating that they could have lost their children or their own lives during the flood.

Depression manifested itself as uncontrollable crying and the loss of appetite. Despite these symptoms, the participants had no access to mental health support to help them transcend their emotional distress. Depression and sadness presented as a common emotion within other studies as well. An exploratory study conducted by van Straten and Ncube (2023: 4) found that people affected by the April 2022 floods, experienced emotions such as sadness, loss and grief. Fitzgerald, Pit, Rolfe, McKenzie, Matthews, Longman and Bailie (2020: 1) who conducted a study amongst Australian rural business owners, following a cyclone disaster, found that 25% of those whose businesses were flooded, had suffered from depression, compared to 12 %, of those whose businesses were not flooded. The study noted that business owners who had a reduced income and whose business had not returned to normal post the cyclone, presented with an increased risk of depression (Fitzgerald *et al.* 2020: 7).

It is possible and likely that pre-existing trauma and the living conditions amplified the mental health distress of participants. The literature reflects extant studies that have documented the high prevalence of mental health disorders following catastrophic events. A significant and sustained increase in mental illness and suicidal ideation was reported two years after Hurricane Katrina by Kessler *et al.* (2008: 6). In Thailand, a similar increase in psychiatric symptoms amongst flood victims, was reported, a year after the flood (Assanangkornchai, Tangboonngam, Sam-Angsri and Edwards 2007: 43). It is possible that many existing psychiatric co-morbidities, could have been

exacerbated through flood exposure and through forced displacement that led to having to endure poor and risky living conditions, within the shelters. These findings underscore the deep impact of such disasters on psychological well-being and supports the need for greater mental health support for victims of natural disasters (Rahman, Shobuj, Hossain and Tasnim 2023: 1; Valladares-Garrido *et al.* 2022: 10; Kino *et al.* 2021: 456). The impact of life in flood relief shelters coalesced into theme four. This is presented in the sub-section that follows.

4.6.4 Theme 4: Life in a shelter

The fourth theme that emerged related to the experiences of the participants, at the flood relief shelters. Due to the intensity of the rains and damage to and loss of their homes, many participants were evacuated and displaced. Some had to move into temporary shelters such as community halls, whilst others found shelter with neighbours and relatives. Most of the participants lived at these temporary shelters for months, until they were relocated to more permanent displaced shelters such as housing compounds and student residence facilities that were not being used. Those who took shelter with family or friends, returned to their homes a few days or weeks after the flood event.

There were five sub-themes which were derived under this theme. These included (i) initial relief and support; (ii) living conditions in the shelter; (iii) impact of living in the shelters on physical health; (iv) disrupted feelings of safety and (v) psychological effects.

4.6.4.1 Sub-theme 1: Initial relief and support

The first subtheme captured the experiences of the flood victims who had to be rapidly evacuated to safety, by bus from their communities to flood relief shelters, in community halls or to their neighbours' homes. They shared these experiences as follows:

“I am lucky we survived. The people from the temple took us to the hall and looked after my children. I was so thankful because I was pregnant and so tired. I think the stress would make me sick. Someone gave me a hot cup of tea and track suit to wear.” (P4)

“I was in one of the first groups to be rescued and taken to the temporary shelters. Men, women, and children were in the big hall, and we received food, blankets, and clothing.” (P7)

“The local councillor took us to the hall, where people from the community donated food and clothing. ANC comrades also came with food, clothes and water. A lot of us from the same street were at this hall.” (P10)

“We were collected in a bus arranged by the community people. I thank God. It was still dark about 4am and still raining heavily. My children and I were taken to the hall. We just capsized there on the floor. We were wet and dirty from running in the mud.” (P20)

“I spent one week at the community hall.... we were provided with food, clothes, water and place to sleep.” (P29)

These narratives collectively reflect the efforts put in place to move the participants and their families to shelters, where they were provisioned with food, clothes and water. Efforts to address the immediate physical needs of flood survivors, suggest the need for the immediate availability of such items during future relief efforts. Most important was that they had a safe space to sleep in. Their rapid move to a flood relief shelter reflects the efforts of local authorities and communities to rally around and support those who had been affected. It would appear that efforts to rescue and evacuate families were undertaken with urgency, which underscores the need for such operational mechanisms to be in place when other disasters occur. Whilst the housing of men, women, and children, within one community hall, reflects a concerted effort to accommodate family members together, it does raise questions regarding privacy

within such spaces. Overcrowding would have been inevitable, due to the urgent need to move people to safety.

The role of local councillors, who joined community-based initiatives, further reflects the commitment of local political and organizational networks, to amplify their response, in relation to the disaster. Most of the efforts levelled during the 2022 flood relief activities, are consistent with Gibberd's (2020: 2) assertion that emergency accommodation following a disaster, should focus on ensuring that displaced people are housed in areas such as a hall, school or under plastic sheeting and that food, water and medical care should be provisioned. Prasad and Francescutti (2017: 219) concurred saying that following a natural disaster potential, the primary intent should be the provision of preliminary assistance, which consists of food, water, sanitation, and shelter. This coheres with national guidelines which state, that following a disaster, basic subsistence such as shelter, food, medicine, clothing, and water must be offered to meets the needs of those most affected (KwaZulu-Natal, Department of Human Settlements 2023: 8)

. Those participants who lived in brick houses did not relocate to community halls but instead took temporary shelter with their extended family or neighbours in the community.

They said:

"My house was not destroyed badly. It was leaking and the water had come in through the door, damaging all the furniture. My neighbour's house was not leaking so I moved in with my neighbour temporarily." (P28)

"God bless my neighbours. They saw we were struggling and offered us a room to stay in. My heart still goes out to them. In this day and age not, everyone is so kind." (P31)

These excerpts reflect the importance of social networks during times of crisis. The ability of a community to handle a crisis is influenced by the strength of their social networks and the emotion and tangible support they provide, as well as support with

shelter, rebuilding and clean-up (Misra, Goswami, Mondal and Jana 2017: 281). Following a disaster such as a flooding event, the establishment of safe housing in the short term and long term is essential for individual and household recovery (Peacock, Dash, Zhang and Van Zandt 2018: 3). Bergstand and Mayer (2020: 11) investigated the long-term appraisals of community recovery after an oil spill in Florida, in the United States and found that most affected people had received help from the neighbours and community, using words like 'we care for each other'.

Another participant moved upstairs within her own home, saying:

"Only the bottom of the house was damaged, I moved upstairs...the municipality gave me food vouchers." (P34)

Whilst this participant was fortunate enough, not to have to abandon her home totally, she was provisioned, with food vouchers. This entrenches the need for local support to ensure that flood affected victims can transition back to the point of normalcy, they experienced prior to the floods. The rebuilding and repair to homes is both costly and timeous and adequate support towards those affected, is crucial to ensuring that they receive support amidst the trauma of the flood experience.

In the wake of natural disasters, international aid organisations and government bodies endeavour to support those affected with basic necessities (Yang, Yao, Tian, Jiang, Xing, Yang and Liu 2023: 14; Negi 2022: 1; Goldschmidt and Kumar 2016: 6). The use of food vouchers as part of disaster relief efforts, has become an increasingly prominent method in both domestic and international disaster response efforts (Holm-Nielsen, Raju and Furu 2022: 1). The South African Social Security Agency, to this end provided food vouchers to those affected during the April 2022 floods in eThekweni (South Africa, Department of Cooperative Governance and Traditional affairs 2022: 11).

4.6.4.2 Sub-theme 2: Experience of living in the flood relief shelter

The second sub-theme that emerged reflected the experiences of life within the flood relief shelters. Participants shared their experiences within these community halls, as follows:

“The local councillor came to take us to the hall. In the hall, it could have been nicer and right. There were too many people, very overcrowded and had no privacy. I could not sleep well in the hall. Although the councillor, community people, and NGOs such as the Gift of the Givers gave us food, a sloppy bed to sleep on, blankets and bottled water, the hall could have been a better place to stay. Many people were drinking and getting drunk and noisy. Some were even fighting there. It was stressful.” (P5)

“There was no privacy as well. Men and women were in the same hall, and it was difficult especially after taking a bath. As a church lady I found the hall not nice at all.” (P9)

“When I first arrived, there were too many people, so it was overcrowded. I had lost my medication, and the overcrowding was really a health-hazard to us.” (P10)

“The temporary hall where we were sheltered was a messy, were overcrowded and hygiene was a real problem.” (P12)

The experience of overcrowding was a pervasive theme in the data. As evidenced, the lack of privacy made it difficult for the participants to sleep, which was important especially since they had all experienced the trauma of losing their homes or were experiencing physical fatigue from having to flee from their flood ravaged communities. Moreover, although local authorities and religious organizations, endeavoured to ensure that their basic needs were met, the conditions within the hall made it challenging to remain comfortable. As reported by the participants, others in the hall were drinking and becoming rowdy, making it difficult for them to de-stress and sleep.

Kawano, Nishiyama, Morita, Yamamura, Hiraide and Hasegawa (2016: 3) argued that the inability to rest or sleep, within these community shelters, contributes to fatigue, irritability, and an increased vulnerability to other health conditions.

The overcrowding therefore caused both physical and emotional discomfort, with the lack of privacy, heightening their personal vulnerability and insecurity. Ajodhia and Makhanya (2023: 9) made similar findings in their study, on the lived experiences of African single mothers, who were displaced in the aftermath of floods in KwaZulu-Natal. They found that women living in shelters also encountered a lack of privacy and overcrowded living arrangements.

In addition, the overcrowding caused the hall to become dirty quickly, due to the volume of people in a small space, leading to unhygienic conditions. This posed health risks for those living in such proximity to each other. The effects on physical health, are presented within sub-theme three which follows. With regards to the lack of privacy issues, one of the female participants, shared that the mixed gender living arrangements in the shelter, made it difficult to bath. This lack of privacy, coupled with substance abuse within the shelter, reflects the heightened vulnerabilities of women in shelters which places them at risk for sexual harassment and rape.

This notion was supported within a study by Fatema, East, Islam and Usher (2023: 4), who reported that the lack of separation of males and females and a safe space to bath for females, led to a fear of harassment amongst women, in a flood relief shelter in Bangladesh. Participants also shared their fear of being sexually assaulted saying:

“It was scary sometimes in the hall, especially at night. The hall was very full and the ladies used to sleep to one side. After a few days of living in the hall the men started to misbehave. I used to be scared to go to the toilet in the night in case someone grabbed me. I used to lie awake and worry why this was happening.” (P23)

“There were over 150 people in the hall. I was grateful I had somewhere to sleep, but I was also scared. I am also very religious, so it was bad. We used

to hear stories of some women getting sexually attacked in the other halls and that we must be careful.” (P15)

These narratives reflect the fear women were experiencing within the shelters, as sexual harassment was occurring within these spaces. One participant even reported that the men had started to become disruptive, leaving her afraid to go to the toilet, in the event that she was attacked. The impact on physical health is discussed under sub-theme three in the sub-sections that follow.

4.6.4.3 Sub-theme three: Life in shelters and the impact on physical health

The third sub-theme that emerged in the data, related to life in the flood relief shelters (the community halls and the more semi-permanent housing of rooms in flats and compounds) and its impact on the health of participants. Participants reported that they were initially housed in community halls following the flooding. Some participants spent up to a week in the halls, whilst most spent up to about nine months there. Thereafter, many participants were moved to semi-permanent housing such as rooms, in flats and compounds.

Several participants shared that hygiene and sanitation, presented health challenges within the confines of the overcrowded spaces of the halls. Participants described this saying:

“I had to get medication for diarrhoea. When we were moved to Frazer, it was better, and the place was more hygienic as well.” (P12)

“I got sick in the hall, I was vomiting, and my stomach was hurting, and I was having diarrhoea...I know it was the water because they said the sewer pipes were all damaged. We were getting water from the tanks. When I went to the clinic, even the clinic had no water. Using the bathroom was terrible.” (P24)

These narratives reflect that there was an outbreak of diarrhoeal infection, within the overcrowded halls. The lack of hygiene coupled with the lack of clean water created a

fertile ground for the spread of infection within such spaces. These findings are reflected within the literature, which confirms the risk of outbreaks of communicable disease in flood shelters (Liang and Messenger 2018: 1). Hence whilst the move to temporary shelters becomes necessary within emergencies, they often lack adequate sanitation, clean water, and access to proper healthcare access which can exacerbate the health conditions of flood victims. Even when victims were moved to other facilities, they continued to endure challenging circumstances. This is evidenced as follows:

“Sometimes, toilets had no water supplies at the first hall. Here at Frazer, it is better but we are still suffering. If electricity is off, there will be no water.” (P22)

Several writers have argued that shelters are associated with disease outbreaks, because of poor hygienic conditions and a lack of adequate sanitation in crowded shelters (Acosta-España *et al.* 2024: 451; Al-Betawi, Ali and Yousef 2020: 12). Kawano *et al.* (2016: 3) supported these findings, saying that crowded shelters make it challenging to maintain cleanliness and proper sanitation facilities. This increases the risk of illness especially for vulnerable groups like children, the elderly, and those with pre-existing health conditions. Conzatti, Kershaw, Copping and Coley (2022: 1) added that displaced populations, present with a higher prevalence of certain diseases including acute respiratory diseases and diarrheal diseases when they have to live in temporary shelters.

Given the potential for the rapid spread of infectious diseases and the emotional distress emerging from same, it is crucial that health services and psychological support be provided, to help those affected transition safely to life, within the shelter and navigate and cope with the stressful and overcrowded conditions.

4.6.4.4 Sub-theme four: Alcohol use and disruptive social behaviour

The fourth sub-theme that emerged focussed on the poor social behaviour, amongst those within the community halls. Both alcohol use and rowdy behaviour appeared to be common within the halls as follows:

“At the first hall where I stayed for seven months. People were drinking too much there and sometimes fighting.” (P9)

“Many people were drinking and getting drunk and noisy. Some were even fighting there. It was stressful.” (P5)

“I lived at the hall for nine months before being moved to Frazer compound. At the hall although there was no privacy, it was not so bad. Sometimes people were fighting, that is normal and expected when too many people are at the same place.” (P15)

These narratives reflect the deep levels of stress and frustration that many people faced which may have led them to abuse alcohol. This coupled with the overcrowding inevitably led to tensions and in house fighting, within the shelter. Without rules in place to govern the behaviour of those residing in community shelters, people resorted to becoming rowdy. Ajodhia and Makanya (2024: 12) supported these findings saying that residents in temporary shelters often felt unsafe, due to the abuse of drugs and alcohol by other residents, and the violent behaviour emerging from same, which placed other residents at risk.

A study conducted by Makoha and Denov (2024: 4) in Uganda, found that people that are affected by displacements are more likely to engage in alcohol and substance abuse. They were found to resort to alcohol abuse, as a negative coping mechanism to help them cope with their stress, loneliness, loss, hardship and grief (Makoha and Denov 2024: 5). A study by Tadesse, Andualem, Rtbe, Nakie, Takelle, Molla, Abate, Kibralew, Kelebie, Fentahun and Tinsae (2024: 6) further found that almost half of the internally displaced women in Africa, had experienced some form of gender-based violence. These numbers may have even been lower, due to fear of reporting, retaliation and stigma. Krause (2020: 187) added that in displaced environments societal norms and general safety may collapse, leaving women more prone to violence. These findings suggest the need to address the risks associated with shelters making it crucial that evacuation sites adhere to security requirements, accessibility, attachment, capacity, convenience, stability, and sustainability (Priyanti,

Hidayah, Rosmahanani, Nahariani, Asri, Mukarromah and Mundakir 2019: 5; Xu, Okada, Takeuchi and Kajitani 2007: 235).

4.6.4.5 Sub-theme 5: Psychological effects of displacement

Sub-theme five focuses on the psychological impact of displacement. Participants described the emotional distress of living in the halls, saying:

“Here at Frazer, I have been here for 4 months, and we are not getting any food. This makes me so depressed and anxious. Life is tough and I am not working.”
(P10)

“There were more than 100 people at the hall. A ward councillor not from my ward was very helpful and assisted very much with information and organising NGOs. But it was too noisy, no privacy and over-crowded. I was always worried about people taking what little I had. Here at Frazer, there is privacy, but we are not being given food, and I am full of worry.” (P11)

One of the key issues emerging in the data, was that although the flood victims had transitioned from the hall to compounds, where they had privacy, they were often left without food. Many felt depressed as a result, which is a common response to hunger related issues. Moreover, their lack of certainty gave rise to heightened levels of anxiety and depressive symptoms, which are common in unfamiliar and distressing environments, such as shelters (Song *et al.* 2025: 4). Despite the challenges of the shared living space, participants, also became tolerant of their living conditions expressing gratitude at having a safe space to stay.

Such unstable living arrangements however can also have an adverse effect on mental health, due to the stress related to accessing food. Such mental health distress is often exacerbated amongst people who have existing mental health conditions (Ejiohuo, Onyeaka, Unegbu, Chikezie, Odeyemi, Lawal and Odeyemi 2024: 5). Carrere, Vásquez-Vera, Pérez-Luna, Novoa and Borrell (2022: 4) supported this argument saying that individuals who experienced housing instability were more prone to mental

health issues, which was exacerbated by other challenges, related to the inability to access or afford nutritious food.

School going children also endured a disruption to their school life. Participants described this as follows:

“We lost all our clothes in the flood. The people at the halls gave us clothes to wear, but the problem is school uniforms for my children. How can I send my children to school with no uniforms? They don’t want to go to a new school and are fighting with me, saying the children will laugh at them. This is very difficult, and I am very stressed.” (P9)

“The grass is too long around the yard, and we fear snakes. Schools are opening tomorrow, and there is no transport to take our children to school.” (P22)

“I can’t afford to buy uniforms; even second-hand uniforms are too expensive. No one thinks about this. I am so worried and scared. The children are just playing here, not going to school because there are no uniforms. Someone gave me shoes for my child, but it was too tight and only one uniform.” (P23)

Many children lost their school uniforms and schoolbooks during the floods, which challenged their ability to return to school. This was further complicated by the lack of transport to reach their schools. Despite donations of school clothing, they were not suitable in terms of size related requirements. Parents became increasingly stressed not only because they lacked the finance to purchase new uniforms and had to watch their children lose many days of schooling for this reason. Undeniably the floods jeopardised the academic progress of children who faced potential failure given the loss of academic time.

These narratives cohere with the broader literature on displaced populations, particularly those living in shelters (Akram and Mushtaq 2024: 3; Otorkpa, Otorkpa, Olaniyan and Adebola 2024: 7; Taylor and Kaplan 2023: 8; Burrows, Desai, Pelupessy

and Bell 2021: 3 and Makwana 2019: 2). Anxiety, depression, and stress were common psychological responses to the uncertainty, lack of privacy, and insufficient resources within such settings (Munro *et al.* 2017: e138). Furthermore, the loss of control over basic aspects of life, such as food, personal space and transport, as well as the disruption to normal family life and the unfamiliarity of such spaces, contributed to a cumulative sense of powerlessness and mental strain (Goo 2024: 7; Basile 2020: 4). Dickson, Ko, Nguyen, Minchenko and Bangpan (2024: 12) argued that addressing these mental health issues, involved the provision of material resources to alleviate their living circumstances, whilst simultaneously providing mental health interventions to alleviate their stress.

The study found that although a few participants returned to their homes after a while, most of the participants were moved from temporary evacuation sites to long-term relocation shelters. Whilst conditions at these long-term relocation sites were reported to be significantly better than those at the temporary sites, affording residents greater privacy, they still continued to endure hardship. Unlike the temporary evacuation sites, food was no longer provisioned which caused substantial anxiety for those without income. Munro *et al.* (2017: 1) also noted the distress confronting displaced individuals, saying that even a year post a flooding disaster, victims presented with depression, anxiety and post-traumatic stress disorder.

The impact on children was documented in a study by Berger *et al.* (2018: 1) who found that children from disadvantaged backgrounds experienced higher levels of stress after a disaster. Their study found that displacement resulted in them having to change schools, which increased their mental vulnerability whilst causing increased frustration, aggression and stress in their homes. Berger *et al.* (2018: 5) reported that school learning was negatively impacted as there was a one third drop in school attendance. The Internal Displacement Monitoring Centre in Afghanistan reported that amongst the displaced households surveyed, more than half of the school going aged children did not attend school. Similarly, in disasters areas such as Nigeria, almost three quarters of the displaced households had at least one child, who could not attend school (Internal Displacement Monitoring Centre: 2022: 113). The data showed that

for these displaced families the costs of purchasing school uniforms was beyond the reach for these families, thereby impacting the children's long term academic success.

4.6.5 Theme 5: Role of religious organisations

The fourth theme that emerged from the data related to the role played by faith-based organisations during the floods. Six sub-themes emerged in relation to this theme. These were namely (i) religious philosophy underpinning faith-based organizations; ii) instruments of humanitarian aid (iii) The impact of the floods through the lens of faith leaders; (iv) nature of humanitarian aid; (v) spiritual support provided and (vi) things that could have been done differently.

4.6.5.1 Sub-theme 1: Religious philosophy underpinning faith-based organizations

The first sub-theme reflected that religious philosophy underpinned the work of faith-based organisations. Boro, Sapra, de Lavison, Dalabona, Ariyaratne and Samsudin (2022: 3) argued that faith-based organisations are usually non-profit organizations, that are driven to serve the communities by their faith, as well as uphold the social responsibility values of their organization. According to Du Toit (2019: 1), faith-based organizations, are inspired by the unique religious values that underpin them; to steer the work they do within vulnerable communities that they are located within. Sider and Unruh (2004: 119) concurred, saying that faith-based organizations, are inspired by their religious faith, as evident in their mission statements. Occhipinti (2015: 336) therefore argued that in many faith-based organizations, humanitarian and development work are viewed as mechanisms to express their religious philosophy and their values of being a good person in the world.

Mansour and Ezzat (2009: 118) noted that almost all religious faiths, particularly the Islamic, Hindu, Christian, and Jewish faiths, had established faith-based organisations to render services to disadvantaged and marginalized communities through acts of compassion and commitment to selfless service. Their religious commitment was used as a foundation to advance humanitarian activities, which resulted in faith-based

organisations conducting many non-governmental organization civic roles, with the added benefit of religious support (Clarke and Ware 2015: 40).

In describing how their organizations acted as instruments of humanitarian aid participants said:

“Our mission is derived from our name Eshcol ... save the lost, feed the poor ...our mission is saving and caring for the lost, feeding the poor and teaching... we provide a wide range of assistance to lessen the suffering of people in our community.” (F1)

“Seva is a pillar of Hinduism and means selfless service... extends to all people regardless of race and religion... the whole world is one family.” (F4)

“We do fully charity work and are guided by the principles of Zakat which means giving charity and sadaqah which means giving voluntarily...these are components of the Islamic belief.” (F7)

These narratives collectively highlight that religious faith inspires and underpins much of the humanitarian work, undertaken to assist communities facing any form of distress. As shared by the participants their diverse religious faiths centred around caring for the community, Seva or selfless service which is central to the Hindu faith drives their work, whilst the notion of voluntary charity is important within the context of the Islamic faith. The notion of Seva in Hinduism, as described by one of the participants has been described “as a selfless act that aims to protect, help, and provide for underprivileged human beings and animals, a service performed without any hopes of reciprocation, monetary benefits, or awards” (Sewajyoti 2020: para. 1 line 1). Pragat (2023: 3) added that Seva was one of the central values of Hinduism, that has become entrenched within the Hindu way of life. In addition to being a strong social framework that encourages community, service, and personal development, selfless service is regarded as a manifestation of devotion to God and humanity (Pragat 2023: 3). Within the Islamic faith, Zakat and Sadaqa are regarded as important Islamic benevolent traditions. Zakat is seen as the third of the five pillars of Islam and

is a required act of giving to the community (Siddiqui, Wasif, Hughes, Parlberg and Noor 2022: 9). Beyond the minimum threshold of Zakat, is the notion of Sadaqa which reflects the act of giving voluntarily. These religious philosophies underpin the work of faith-based organizations, who work tirelessly to provide humanitarian aid during times of disaster. This was evidenced in the narratives of the faith-based leaders.

Faith-based organizations are well-defined by their religious principles and operate to provide social services, to meet the spiritual and material needs of communities (Jahani and Parayandeh 2024: 12). Due to their religious philosophy of helping people that are in need, religions across the world including Christianity, Buddhism, Hinduism and Islam have for centuries provided humanitarian aid to destitute families (Nuridin 2024: 2). In a descriptive study of Pentecostal megachurches in Nigeria, Adedibu (2023: 9) highlighted that the theological belief of relieving socio-economic challenges of communities shaped the spiritual and social services offered to disadvantaged communities.

Ha (2015: 1323) in a study of three religions, namely Christianity, Buddhism, and Confucianism, described the role of religious institutions with regards to disaster management, saying that these organizations often understand the local culture, nature of the disaster and can provide care orientated humanitarian aid. Fishbein, Frongillo, Samin, Richards, Blake, Saunders and Shapiro (2023: 6) who conducted a qualitative study in South Carolina, United States of America, found that faith-based organizations, had prioritized meeting the basic human needs of food and shelter in their communities as a spiritual calling and fulfilling an obligation to God. Similarly, Jahani and Parayandeh (2024: 12) who conducted a study in Iran, further found that faith-based organizations were driven by religious obligations and compassion and had incorporated faith into their services through spiritual guidance and their religious teachings.

4.6.5.2 Sub-theme 2: Instruments of humanitarian aid

The second sub-theme focused on faith-based organizations as instruments of humanitarian aid, within the context of their flood relief work. Rakotoarison, Dietrich

and Hiilamo (2021: 1) argued that in spite of modernisation and secularisation faith-based organizations, have the capacity to position their work in religion, thereby strengthening their influence within communities. Faith based organizations, who provided humanitarian aid within communities, did so as a result of their religious philosophy.

Participants described how their faith-based organizations served as instruments of humanitarian aid, saying:

“As the church...we are a religious organisation but we also able to meet the needs of the entire community when in need.” (F1)

“Through the love of Christ, we reach out to people suffering ... assisting communities through charity in all areas....” (F2)

“We are a faith-based organization...we take care of people in need” (F3)

“According to the Rigveda which is 2000 BC it is stated that God is One...people call him by many names...we believe that all children are children of God, regardless of their background.” (F4)

“Ours is a Muslim organization, but the teaching allows us to help all people in the community from all religions.” (F8)

These narratives reflect that each faith-based leader's religious beliefs, did not preclude other religious groups from receiving humanitarian aid from them. Instead, the religious philosophy embraced by these different religious groups, underscored the importance of helping all of humankind regardless of their faith. Jacinto, Figueiredo Dalla Costa Ames, Serafim and Zappellini (2023: 541) for example sought to understand how religion and spirituality guided the operational activities of faith-based organizations, during the COVID-19 pandemic, in Brazil as they endeavoured to provide services to the community. They found that religion and spirituality had contributed to them offering services to all affected people, regardless of their religious faith.

Similarly, Baidhawya (2015: 190), who explored the role of a Muslim faith-based organization, Muhammadiyah, in disaster management, in Indonesia following the 2004 Tsunami, found that the faith-based organization had practiced tolerance and provided non-discriminatory humanitarian aid to all affected people. The study found that four categories of support, were provided to the community namely, medical supporters who worked with hospitals and clinics, psychosocial volunteers, environmental health volunteers and volunteers that worked with the youth. In addition, Motswapong (2022: 166), described the work of faith-based organizations, sharing how they provisioned food and healthcare services to low-income families and communities affected by natural disasters. He reported that this was done as the central activities of many Hindu faith-based organisations. The Hindu Sathya Sai Centre in Mombasa, was also found to provide humanitarian assistance to all affected people, following the 2018 floods in Kenya, which left thousands of people homeless (Motswapong 2022: 169). Ede (2020: 110) similarly described the provision of relief materials and aid to all people who had experienced natural disasters in Nigeria. This was undertaken by Christian organisations such as the Caritas Nigeria. Likewise, Chida and Chabata (2016: 42) described the provision of humanitarian aid by Celebration Church International in Harare, Zimbabwe, which helped the poor and vulnerable as a central tenet, not just to members of the church but also to non-members.

The humanitarian work undertaken by the Christian, Hindu, and Muslim faith-based organisations, during the April 2022 flood disaster was similarly intricately connected to their religious philosophy of helping all in distress. Their various religious philosophies underscored the humanitarian aid being provisioned to all, transcending their own religious faiths to serve all humankind during a time of crisis. This was narrated by the participants as follows:

“The charity department in the church identifies all less fortunate people in the community, regardless of religion and via our members and donations we provide assistance, for example, food to various children’s homes, the blind and deaf society.” (F1)

“Hunger has no colour.....our organisation although is known as a Muslim organisation, we provide bread to all people, all races and communities even supporting churches, temples and mosques so that they can feed their communities.” (F7)

As reflected in these narratives, these faith-based leaders recognized that hunger was universal to all disadvantaged communities, and they believed that it was their religious duty, to help alleviate hunger poverty amongst them. Ferris (2005: 316) asserted that faith-based humanitarian organizations work within the same political, social, and economic contexts, as secular organizations and that their commitment to alleviate human suffering, remains their priority. The literature in fact indicates that religious organisations accentuate assisting those in need regardless of differences (Hamdi, Aderibigbe, Idriz and Alghfeli 2024: 2; Khafagy 2020: 1). The work of Khafagy (2020: 1) on Islamic FBO humanitarian programs illustrates that faith-based organizations, particularly Christian and Muslim faith-based organizations, were significant entities, within the international stage and as a result of their shared religious missions and caring ethos, their partnerships have contributed to the well-being of affected communities. A study conducted by Hamdi *et al.* (2024: 2) on the role of various religious charitable organizations in the United Arab Emirates towards migrants, shared that those religious principles formed the basis of charity provided which underpinned their moral responsibility to support all migrants within communities irrespective of religion (Hamdi *et al.* 2024: 2). The data from their study mirrors the work of the organizations in the current study, as they also had provided social relief as part of their mission (Hamdi *et al.* 2024: 11).

4.6.5.3 Sub-theme 3: The impact of the floods through the lens of faith leaders

The third sub-theme that emerged from the data, illustrated the impact of the floods on families and communities, through the lens of faith-based leaders. They described this as follows:

“I got a call from the youngsters in the area saying that most of the shacks were swept away and their mothers and fathers had no place to stay. It affected me, I was emotional and thought how can I help. I spoke to my wife and called the church members.” (F1)

“I was emotionally and spiritually affected by the devastation of the floods. I felt hurt and broken, and I felt what the victims were feeling. Immediately, I had to summon the church leaders to find a way to assist the victims.” (F2)

“I was shattered at the destruction and loss. Most of the shacks were just swept away, the sheets of iron that made up the walls, smashed against one side of the hill.” (F9)

“You can’t imagine what we saw, entire parts of informal settlements were washed away. The force of the mud slide, the flow of the water with the remnants of homes was so powerful it crashed into other homes pushing them away, with the people still inside.” (F4)

“Most of the homes in the squatter camps were washed away, people were left with nothing just the clothes they were wearing..... You couldn’t recover anything. It was very sorrowful and sad. Children, babies the elderly had nowhere to go.” (F3)

These narratives cohere with earlier data collected from flood victims themselves with regards to the severity of the impact of the floods. The devastation to informal settlements were clear, as many of those who lived in shacks were left homeless. The flood left a large trail of irreversible damage to their homes and swept away all their belongings. Those most vulnerable, like babies and the elderly were left destitute, causing many of the faith leaders to become distressed at their plight. They instantly rallied together with members of their church, to assess their situation and begin immediate relief work. Not only did families lose their homes, but their livelihoods. One of the faith-based leaders shared:

“The loss was unimaginable...a lot of people had their farms and crops washed away.. their livelihood was from their farms and all this was washed away” (F4)

Destruction to farms and their livelihoods, further crippled those who had lost their homes as well. As narrated the crops were also damaged, causing the loss of food supplies, which in turn destroyed this source of finance for farmers. The most difficult experience for them, however, was bearing witness to the loss of life within these communities. They shared this as follows:

“It was overwhelming...the loss of lives...it filled me with anguish and fear. My heart went out to those, bodies were washed away and not found...It felt their pain.” (F4)

“It was very sad to see people going to sleep without food and water. Mothers were distraught... I saw small children clinging to their mothers. People lost their lives. We found bodies in the bushes” (F5)

“We only saw the damage the next morning...I was so traumatized....there were bodies hanging from the bush in the areas, where the banks had washed away.” (F7)

Not only did the floods destroy homes, but many people lost their lives in a traumatic way. As shared by one of the faith leaders, people were washed away, never to be found. This meant that families required both emotional and spiritual support to come to terms with these sudden and unexpected losses. Some bodies however were found in the bushes, as faith based organizational members assisted in search and rescue efforts. Hence not only were families left homeless, but they had to come to terms with the tragic loss of loved ones. Faith-based leaders, offered spiritual support to those bereaved and also through their active participation in the search teams as follows:

“We were getting messages from community members of people missing, washed away, bodies being found. We felt the pain of the families and the ones still searching. We prayed for the strength and comfort for the grieving and the

rescue teams. We also knew that God calls us to be his hands and feet during these times of crisis.” (F1)

This was exacerbated by the fact that they had no food and clean water and had to survive in cold temperatures, amidst rain, that was still continuing to fall until they were moved to safety. This was evidenced as follows:

“When I saw that the rain was not stopping, only getting worse, I felt sick ... because I knew that so many people will be suffering. I felt hopeless, and prayed that people would get to safety...I was thinking of what we could do to help” (F7)

“When we took the bread to the people who were temporarily housed in one of the churches in town, I will never forget what I saw. Small children, old women ... everyone.... sitting huddled, no one talking loudly... I knew we had to talk to them, so get them out of their shock ...’ we are here to help...you are not alone...you are safe’ I said.” (F8)

The human costs of the flood disaster also traumatised the faith-based participants, who endeavoured to ease the plight of the flood victims. As narrated, they opened their churches to house the victims and provisioned them with bread. One shared how they provided emotional comfort and support to victims, by reassuring them that they were not alone and that they were now safe within the confines of the church.

The narratives of the faith-based leaders reflect their deep emotional distress, as many shared feeling "hurt," "broken," "anguish," and "distressed". These words capture the deep pain that they shared with the families and community. Their religiosity and spirituality and ability to identify with those affected with compassion, empathy and kindness, was undeniably linked to their religious roots and values. These excerpts reflect that their faith underpinned their drive to act and serve these vulnerable individuals and families.

The mental health effects on faith leaders working with disadvantaged communities, is documented within other studies as well. Pastors in the United States of America for example, were found to be at risk of burnout, due to the intensity of emotional distress encountered as they provided humanitarian work during the COVID-19 pandemic (Barna Group 2021: para. 1 line 2). Other studies with Muslim, Jewish, and Christian religious leaders further found that more than half of these samples, were presenting with symptoms of post-traumatic stress disorder which emerged from working within circumstances which were distressing (Ruffing, Bell and Sandage 2021: 1).

In addition to the considerable devastation to homes, many of the faith-based leaders, bore witness to the damage to community infrastructure. This supported earlier findings, where community members, had reported same. They described the damage as follows:

“A lot of the roads were damaged, huge sinkholes washing away the roads. Some areas like the roads on the M4 to Tongaat were completely destroyed. Bridges that existed for decades were washed away.” (F1)

“I was getting messages on the group chat about roads and bridges washed away, no electricity, no water. It was total chaos.” (F3)

“The electricity and water structure were washed away, roads damaged and bridges...the whole community was affected.” (F3)

These narratives, support earlier findings with regards to the intensity of the flood waters, that had not only eroded informal settlements, but had caused the collapse of roads and other important infrastructure, that was crucial to enabling access to communities. The destruction of roads inevitably hampered search and rescue efforts and the provisioning of humanitarian aid within these communities. Not only was infrastructure destroyed, but religious sites were also washed away. One of the participants described this saying:

“The temple where a lot of the community did their prayers was washed away. This temple had stood strong for from the 1950’s. My heart was heavy, I struggled to think as I stared at the ruins. Although I am a grown man, I could barely hold back my tears, but I knew that with prayer and hope our community will rebuild.” (F6)

As evidenced historical worship sites of deep religious significance, were also damaged. The deep grief of one of the faith-based leaders was evidenced in the aforementioned narrative, as he struggled to come to terms with the loss of a temple that had been in existence for almost five decades. Not only were the homes of communities destroyed, but sacred worship sites irrevocably damaged, reflecting the poignant loss of cultural and spiritual symbols. Despite this he echoed the hope of many other faith-based leaders, that homes and the community could be rebuilt.

Other experiences of suffering that children and families encountered was described as follows:

“Everywhere you went you saw people suffering. Children as small as 5 years old were helping and carrying heavy buckets to collect fresh water, struggling...I even saw people collecting water to drink from the runoffs on the mountain side. These images haunted me, I can still see the cry for help in the children’s eyes.” (F6)

The floods brought immense suffering as families, were even left without access to clean running water. Very young children were forced to collect fresh water, with some resorting to collecting drinking water from freshwater springs near the mountain tops. The desperation amongst community members, caused immense emotional distress amongst the faith-based leaders, with one saying that the harrowing experiences they encountered had continued to haunt him. Despite the difficult and traumatic circumstances, they encountered, the faith-based leaders in the sample, continued to offer humanitarian aid as part of their religious duty. This was described in a study by Kitula and Mhando (2024: 1) in Tanzania, who asserted that many Islamic and Christian religious organisations assisted people in need, as part of their faith and in

terms of fulfilling their duty to God. In fact, Feener and Wu (2020: 1) posited that many religious organizations expounded values of compassion and generosity and underscored the value of serving the needy, through humanitarian work which included donations and providing physical assistance as part of relief work during disasters. Mazraeh, Khodarahimi, Hesam, Rasti, Khodarahmi, Aganj and Sheikhi (2023: 119) explored the influence of social interest and empathy on helping behaviours amongst helping and non-helping individuals during the floods. They found that individuals in the helping group, had a greater performance in terms of their emotional responsiveness and willingness to assist as with the current cohort.

A study conducted in Australia, by Eriksen (2019 :4), with disaster recovery workers from various Christian denominations, who worked at the time of the bushfires, found that disaster recovery workers, had experienced significant emotional distress. Similar to the current study, members of faith-based organizations, experienced greater compassion, and empathy and found solace in prayer as they assisted with recovery operations amidst the chaos of the disaster.

Several other studies, reflect the trauma experienced by faith-based leaders, as they have to encounter the emotive reactions of distraught survivors, who present with grief, distress and anger. Inevitably faith-based leaders also begin to present with mental health symptoms related to stress, anxiety and depression (Mao, Fung, Hu and Loke 2018: 602; Walker, McKune, Ferguson, Pyne and Rattray 2016: 9). In many instances, faith-based organizations, are first responders, at the scene of natural disasters endeavouring to support the evacuation and rescue of affected people (Okyere *et al.* 2024: 294). Macpherson and Burkle (2020: 111) therefore asserted that a high number of these first responders experience mental health issues. This was further documented in a study conducted by Mikutta, Schmid and Ehlert (2022: 7), in Switzerland, who found that mountain rescue workers were presenting with symptoms of post-traumatic stress disorder.

4.6.5.4 Sub-theme 4: Nature of humanitarian aid

The fourth sub-theme focused on the nature of humanitarian aid that was provisioned by the different faith-based organisations. This immediate relief was crucial to the affected people as follows:

“We immediately provided food, bedding, toiletries at the hall. We set up a soup kitchen and made meals for breakfast and supper 7 days a week.” (F3)

“Entire areas especially the squatter camps had houses washed away...we provided also 500 mattresses at a time.” (F7)

“We provided food, cooked food because people had no stoves... also provided tea and cold drinks” (F5)

“We provided fresh baked bread, milk, water, as people had no access to water and hot meals 5-6 decks (pots) a day.” (F7)

“We prayed and immediately started making bread as there were calls from everywhere of squatter camps being washed away, people hungry and even dying.” (F7)

“We provided hot meals, tea, clothes and even medicine and stationery packs for the children.” (F6)

These narratives reflect the multitude of ways in which the different faith-based organizations rallied around to support the flood devastated communities in eThekwin. Their rapid provisioning of food to alleviate hunger, especially in the initial hours when food distribution systems were interrupted, ensured that those who had lost their homes or those injured had hot meals and clean drinking water. These organizations began provisioning the community with freshly baked bread, medication where necessary and clean water, and stationery for school going children. They also

provided mattresses to the community flood shelters, for those who needed to be evacuated to shelters, following the loss of their homes.

The faith leaders however ensured that they thoroughly assessed the situation and put together concrete plans to support those most affected. They described how they considered the special dietary requirements of the elderly and babies saying:

“When talking to the older people in the halls I realised that they also had different requirements, when I looked at these older people, I recalled my father. They preferred porridge and fresh fruit, so as an organization we made sure that we obtained that for them.” (F6)

“As we were delivering the water and the food, we realised that there were babies and infants that needed formula. We sent WhatsApp messages on our groups and the community rallied around to obtain the formula for the babies.” (F8)

A systematic review conducted by Phraknoi *et al.* (2023: 6), similarly noted that elderly people are a population, who are often over-looked in a disaster response. This underscores the need to consider their heightened vulnerability during disaster responses. Similarly, Massey, Smith and Roberts (2017: 17) found in their study on the health needs of older populations affected by humanitarian crises, that in addition to physical and mental health, nutrition was an important consideration for elderly people during disaster response.

As within any crisis however, there were those who exploited the situation. One leader said:

“I was giving bread for free, yet others were selling bread at exorbitant prices due to shortage. The whole scene was very heart-disheartening and stressful” (F9)

The data revealed that humanitarian aid was not just provisioned at the height of the flood crisis, but continued well after the disaster, going into weeks and at times months after the floods. The nature of this was evidenced as follows:

“As soon as the devastation was known we started getting messages on our chat groups of homes washed away and need for shelter for about 120 people...without hesitation we housed them...we housed them for over eight months” (F3)

“Our members even used their garages...they moved their cars out ...and offered shelter to people in their garages. We used the Sabha halls...we had four halls and used this to house the people. We approached the department and managed to get the schools in the areas to also use their halls to house people when the floods occurred.” (F4)

“Our Seva allows us to provide relief to people...we opened up our homes for people to stay.” (F5)

“We opened up all our halls as temporary shelters for the people.” (F6)

“We also provided our own congregation equipment to use in the organization halls such as the microwave ovens, kettles irons...where the people could cook their own food” (F2)

“Eventually after a while, we also started buying groceries and allowing the people to make their own meals. We provided the gas, stoves, utensils...we enjoyed providing. God has given us. So, we can provide.” (F3)

As described by the faith leaders, many faith-based organizations, opened up their temples, religious halls and venues, to provide shelter to those who had lost their homes. Their compassion and deep desire to serve those most needy, extended beyond welcoming them into their religious spaces, but also where possible into their homes. As narrated one of the religious sites, helped house one hundred and twenty displaced people for over eight months. Given that most religious organisations use

their churches or temples use their venues for communal prayer services, but also other celebratory events such as weddings, they were well equipped to house the flood victims, store food required and allow the displaced people, the space to cook their meals in their kitchens.

The extensive networks of faith-based organizations and their existing infrastructure, and volunteers can therefore be rapidly mobilized to provide shelter, food, medical care, and spiritual support to disaster victims (Sheikhi, Seyedin, Qanizadeh and Jahangiri 2020: 7). In the current study, the faith leaders networked with schools to serve as shelter sites. Hence the ability of faith-based organizations to leverage support and relief aid in the immediate aftermath of a disaster when formal aid structures may be overwhelmed or inaccessible cannot be overemphasised (Okyere *et al.* 2024: 16; Atkinson 2014: 169).

De Vita *et al.* (2008: ii) underscored the role of faith-based organisations, saying they were crucial in providing relief services such as food, water, clothing and temporary shelter during times of emergency. Okyere *et al.* (2024: 13) who studied the role of faith-based organisations in providing relief, in an informal urban Accra in Ghana, which is prone to disasters such as floods, droughts/famine, fires, earth tremors, coastal erosions, structural collapse and landslides, found that they were often the first responders and were found to be most efficient in mobilizing local resources and providing food, water, sanitation, and health services to community members, who were impacted by disaster events. A study by Kotani, Tamura, Li and Yamaji (2021: 1407), similarly found that mosques in Japan had responded to a disaster situation, by providing support by housing evacuees, providing water, portable toilets and food. Similarly, Chida and Chabata (2016: 42), reported that a Christian faith-based organisation, in Harare in Zimbabwe had made significant efforts to provide emergency aid in the form of food and sanitation and other health related necessities during a disaster.

A report related to the role of faith based organizations and philanthropy, which was conducted in India, Jena and Ranjan (2015: 27-39) stated that Hindu faith-based organisations were pivotal in providing emergency relief during disasters, by cooking

food providing drinking water, setting up tents, provisioning blankets, and clothes, to assist affected people (Jena and Ranjan 2015: 37).

The faith-based leaders also shared that they tapped into their own budgets and sourced donations and sponsorships from others to help the victims. They said:

“The church used our own funds, as well as donations received from a political party. A doctor and his wife gave donations of bedding and blankets. The whole community gave donations. Some as far as Pietermaritzburg sent clothing.” (F3)

“We went to sponsors and also our members took out money from their own pockets...we went to communities’ door to door to ask for cloth donations. We used our own transport to pick up and drop of these items.” (F4)

“We also approached other businesses for donations” (F5)

These narratives reflect the extent to which faith-based organizations had endeavoured to raise funds, by seeking donations from businesses and political entities as well as securing community involvement and sponsorships of clothes for victims. Their efforts underscore the logistical efficiency of these organisations in the face of creating a collaborative response to the disaster and developing community support and unity to assist those who had been disadvantaged. The ability of faith-based organizations to become significant role players in disaster management and to rapidly secure funds, resources, donations and volunteers in an expedient manner, can be linked to their religious beliefs and mission to serve the needy (Jahani and Parayandeh 2024: 12).

Much of the philanthropic work undertaken by these organizations then, is related to donations from the public who often support the religious beliefs and mission of these organizations (Du Toit 2019: 1). A study conducted by Fede, Pearson, Kerich and Momenan (2021: 14) found that donations were influenced by the altruistic nature of people and by those who donated when the need was great, especially when they

believed that it would improve the welfare of others. Khalli and Sharif (2024: 29) described the role of masjids (mosques), in responding to disasters in Malaysia, following the 2021 flood. The organization provided crucial assistance by provisioning and co-ordinating rescue efforts by using their boats to rescue people stranded in floodwaters.

Not only did the faith-based leaders provide material relief, but they provided physical help during rescue efforts. The leaders described this saying:

“We tried to reach Isipingo to help the communities there, but the N2 highway was flooded with large shipping containers floating on the highway. Cars were stuck, with families still inside. We made a human chain with other drivers to get them out of the cars. I remember this one car had a child in it. My ankle got stuck as we hurried to save them. It was terrible thinking what could happen” (F6)

“The shacks were covered in mud, the mudslide must have happened in the early hours of the morning. The mud was still thick and like sludge, it was hard to walk. There was a man searching in the mud, desperately searching for his family. His neighbour had died trying to save his family. I know he was traumatized. I tried to help him move one of the iron sheets, but it was heavy with the mud. It was no use. Nothing could be recovered.” (F7)

“I went with one of my colleagues to a house which was also destroyed in the mud, it was heart wrenching, the house was in the informal settlement and was partly washed away. We spent hours going through the mud and rubble. It was dangerous because of the sharp pieces of metal...even fridges and stoves were swept away.” (F8)

These narratives reflect the devotion towards community, as faith leaders in the current sample risked their lives and safety to assist with the search for those who were lost or left stranded in floodwaters or trapped in mudslides or their homes. As reflected, they encountered dangerous and risky situations and despite having no

background training in rescue operations, braved very hazardous conditions to either rescue or search for those trapped. Whilst emergency response teams and medical services such as paramedics become intensively involved in such operations (Wanner and Loyd 2022: 2), they are often overwhelmed by the intensity of such disasters, which creates delays in rescue efforts. Their limited capacity prevents them from reaching everyone in all areas rapidly (Ganoe, Roslida and Sihotang 2023: 2). Time is often crucial in ensuring that those trapped and injured receive urgent medical assistance and hence the efforts of these leaders to join the community in rescuing those affected, were commendable. Whittaker, McLennan and Handmer (2015: 9) in fact emphasized that those who volunteer and help during a crisis are invaluable resources in the emergency response, as they are usually first at the scene of an emergency. Ganoe *et al.* (2023: 8) described the salience of volunteerism in disaster management, saying that volunteers played important roles in supporting search and rescue missions and providing relief aid and medical care during disasters. They added that the majority of volunteers were motivated by philanthropy, empathy and a sense of duty towards people affected by disasters, similar to that of the participants in the current study. Breen, Meyer, Becker, Purdum and Nolan (2024: 6) studied the factors influencing people to become volunteers and found that religious values played an important part of volunteering, with volunteers expressing that they believed that they served a higher power, by serving others.

4.6.5.5 Sub-theme 5: Spiritual support provided

The fifth sub-theme that emerged related to the roles of faith-based organisations in providing spiritual support. Natural disasters create substantial physical, economic and health effects, but also have profound spiritual implications for those affected. As individuals, families and communities struggle to cope with their losses, both material and the loss of lives, their fears, and displacement, spiritual support becomes crucial to providing them with strength and resilience to heal.

There were two types of support that faith-based leaders provided. This included spiritual counselling and prayer. With regards to counselling, many of the faith leaders, namely the pastors, moulanas and other faith-based counsellors, offered one-on-one

and group counselling to help individuals process their grief, losses, and navigate the trauma of the flood.

Their interventions with community members at a spiritual level, were described as follows:

“We prayed for the safety of people.. for them to have strength to bear their losses they have suffered and not to fall into states of depression or suicide...we prayed for the safety and well-being.” (F4)

“We see God as One and prayed for the people that were suffering, we offered counselling to anyone in need...even spending time with the people helped them to be calm and distress.” (F5)

“We prayed a lot with individuals, families and the community when we dropped off the items.... If it was non-Muslims we spoke of God and praying to God.... for Muslims we used the word ‘Allah’....and people felt at peace.” (F7)

“We helped people with prayer as individuals and with families to give them comfort, courage and hope, both to Muslims and non-Muslims. The Moulana also prayed.” (F9)

“We helped a lot of people with prayer to give them hope and courage.” (F9)

Prayer was also undertaken with spiritual counselling as follows:

“Our pastoral team conducted a lot of the prayer, and spiritual counselling. A lot of people needed it, children had lost everything and needed spiritual guidance. We invited others to also come and pray in the halls.” (F1)

“Counselling was provided to the victims. People were highly traumatized, people were crying. We counselled them and tried to be philosophical, and instil positivity, encouraging them.... saying this day to shall pass, tried to instil hope for the future” (F4)

“I remember going to the Lamontville area to see how I could help and seeing people clinging to each other in desperation, watching their hard earned things getting damaged. One lady asked me helplessly, ‘why this happened’. I didn’t know how to answer her, I held her hand and said ‘Ma, lets pray, everything will be alright’ I can’t forget the look in her face at having lost so much.” (F6)

As reflected in these narratives, faith-based leaders took time to engage people and families in prayer, trying to offer peace and comfort as they worked through the psychological effects of their trauma and their losses. These leaders created opportunities for reading and reflection on scripture with the affected people at the flood relief centres and at their places of displacement, endeavouring to uplift their mood and instil hope, courage and strength as they came to terms with the loss of their loved ones. Religion did not act as a barrier as the leaders, prayed for and together with everyone regardless of their religious denomination.

These findings cohere with existing literature which reflects the salience of spiritually based counselling in helping victims of disaster to regain their hope, courage and strength during times of crisis (Okyere *et al.* 2024: 15; Hirono and Blake 2017: 10). Saidon, Ab Manan, Sueb, Abd Rahman, Sahari and Aziz (2020: 175) posited that in addition to the psycho-social impact of natural disasters there are severe spiritual complications for those affected people.

Those affected by disasters often seek religious activities like prayer and value spiritual support as they come to terms with their losses (Nejati-Zarnaqi, Khorasani-Zavareh, Sohrabizadeh, Ghaffari, Sabour, Nouri and Mohammadi 2024: 166). Following the September 11 terrorist attack in the United States, a nationwide survey conducted by Schuster, Stein, Jaycox, Collins, Marshall, Elliott, Zhou, Kanouse, Morrison and Berry (2001: 1), found that ninety percent of people who experienced stress, had turned to using religious practices to cope with the stress. Hirono and Blake (2017: 1) reported that by instilling faith, hope and courage, the development of post-traumatic stress disorders can be reduced.

A recent study conducted by van Straten and Ncube (2023: 4), related to the survivors of the April 2022 floods, found that the spiritual and mental health aspects of survivors had been overlooked. They therefore argued that it was important for the spiritual needs of people to be included within holistic disaster management interventions. Meditation was also used by the faith leaders to help the stricken flood victims. One of the participants described the use of meditation as a calming tool saying:

“We don’t impose religion on people. We offered people the opportunity to meditate... Meditation is a simple tool to calm their mind and give them peace.”
(F4)

The use of meditation, as a spiritually based approach was positive as it did not involve religious proselytization and was easily used by one of the faith leaders, to create peacefulness, amongst those in the flood shelters. Natural disasters such as floods create considerable levels of mental health distress and trauma thereby affecting the well-being of victims (Yousuf, Mehmood, Aquil, Rija, Rahmat and Malikzai 2023: 222). It is therefore important for those affected people to be calm during stressful events (Wahid, Ghazi and Lashari 2023: 273) as feelings of anxiety and panic are often precursors to post traumatic stress disorder (Sarfaraz, Rafique and Sohail 2023: 1).

Müller, Rapoport and Rahe (2024: 11) supported the use of mindfulness meditation, saying it had benefited flood victims and disaster volunteers, in their study, due to its ability to alleviate adverse effects, perceived stress, and other pathological symptoms caused by flood disasters. Wahid *et al.* (2023: 276) who conducted a study on displaced flood victims in Karachi, Pakistan, found that post-traumatic stress disorders caused by flooding disasters, were reduced by meditation. Other studies have documented the general efficacy of mindfulness interventions, in terms of reducing mental distress (Vonderlin, Biermann, Bohus and Lyssenko 2020: 1579); anxiety (Zhou, Guo, Lu, Chen, Xie, Liu and Zhang 2020: 6; Blanck, Perleth, Heidenreich, Kröger, Ditzen, Bents and Mander 2018: 7) and depression (Reangsing, Rittiwong and Schneider 2022: 1), making it a valuable spiritually based tool to use during times of natural disasters.

The faith-based leaders further shared, that they had reached out to those within other religious organizations to help. This was described as follows:

“The Bible tells us we need to love and take care...we also reached out to other churches who were well versed with isiZulu, as we were not very fluent with the language. They came here and also prayed and offered spiritual counselling to the people in isiZulu.” (F2)

“We took the community Moulana (Muslim priest), to the places where the displaced people were and prayed together. We made them understand that this time will pass and to be strong. When we remember God. God will remember us” (F7)

This narrative reflects how faith-based leaders used their pre-existing community networks to strengthen their outreach efforts and provide psycho-spiritual support. This was important in reaching those who belonged to other religious groupings and where language was a barrier. This was evidenced as they reached out to a moulana and pastor who could provide hands on spiritual support within the community space. Through this they were able to offer prayer sessions and counselling to survivors, in a way that they could understand and benefit from.

Numerous studies have documented the need to act expediently, particularly during natural disasters, when there is a sense of urgency thus making collaboration between various stakeholders crucial (Guerrero, Bodin, Nohrstedt, Plummer, Baird and Summers 2023: 1; Brown and Susskind, 2020: S64; Nowell, Steelman, Velez and Yang 2018: 699). The narratives reflect the value of collaborative work, that transcends religious beliefs, so that those most affected can receive the support required to cope with their plight.

4.6.5.6 Sub-theme 6: Things that could have been done differently

The last sub-theme focussed on what the faith-based leaders believed, could have been done differently to support the victims. They believed that the rescue and evacuation process was too slow saying:

“The disaster team was too slow...lives could have been saved.” (F4)

“Officials could have acted faster.” (F5)

These reflect that the response by the disaster response teams, were slow thereby leading to the loss of lives. Other leaders observed the following saying:

“Just telling people to evacuate will not illicit a response and those authorities needed to implement evacuations and enforce it.” (F1)

“They also need to understand that people don’t want to leave their hard-earned belongings behind.” (F2)

One of the faith-based leaders believed that the evacuation process was not enforced as stringently as it should have been and consequently endangered the lives of many. They also believed that it was important that many poor communities were affected, and people struggled to leave their hard-earned possessions behind during the evacuation. Hence this would have slowed down the evacuation process and caused many to ignore calls to evacuate. This would have placed them in grave danger, suggesting that some community education initiatives be implemented to ensure this does not occur in future.

Other faith leaders observed that at risk communities were not notified timeously, which also increased their risk. in time. They said:

“People in low-lying areas were not notified and could have moved to higher grounds. They did not have enough timeand lost everything. People died and their bodies have not been recovered yet.” (F3)

“When it happened the emergency services were nowhere to be seen.” (F3)

These narratives reflect the need for early warning systems that would have ensured that those in low-lying areas, could have been moved to higher grounds. He described that many people lost their lives, but it was even sadder for families when their bodies were not recovered. This would have created greater distress and complicated traditional funeral rites and mourning rituals. Early warning systems, coupled with the rapid and tangible presence of emergency rescue personnel is therefore crucial for future disaster preparedness. The delayed evacuation of vulnerable communities especially those in the low-lying areas near the rivers and those in areas prone to mud slides, require prioritization as many people were caught off guard by the rapid onset of torrential rain.

Whilst there is a need for early warning systems, weather alerts may not reach those in marginalized and vulnerable areas. People living in informal settlements and in rural areas, do not have access to the infrastructure, that would enable them to receive timely and accurate warnings. This has been documented in other studies as well. Mudefi (2023: 16) for example found there are multiple levels of gaps in disaster management processes. Maluleke (2022:4) opined that due to existing faults in governmental processes, the disaster reaction was slower with decreased proficient allocation of evacuation and rescue activities.

Ngcamu (2023: 7) supported the findings in the current study, arguing that during the April 2022 floods, the lack of adequate use of technology and poor early-warning systems compounded the effect of the floods. Sutherland (2024: 10) supported this saying, a “Community Based Flood Early Warning System,” that was implemented within the Quarry Road West Informal Settlement in eThekweni resulted in decreased loss of lives, being reported, although there was destruction to almost three hundred and fifty housing structures. Jewkes *et al.* (2023: 2) added that the even with previous rainfall experiences, the metropolitan and the inhabitants were not prepared for the amount of rain that fell on the 11-12 April 2022.

Collectively the data from the leaders of faith-based organizations, reflected the depth of both their material and spiritual assistance. Insights gathered from these participants further underscored the valuable role of faith-based institutions, entrenching their position post the crisis of a natural disaster. Not only were they able to mobilize resources, but they were able to foster community solidarity, and network with other stakeholders in ensuring that victims were adequately supported and safely housed.

4.6.6 Theme 6: Community Support

The final theme which emerged in the data related to the nature of community response and their roles in relief efforts during the floods. Three sub-themes coalesced to form theme five. This included namely, (i) formal support of community; (ii) informal support and (iii) spiritual support received. Sub-theme one focuses on the formal support provided by the community.

4.6.6.1 Sub-theme 1: Formal support of community

Formal support provided by community networks, organizations and members, related to the help that victims received from social workers, non-governmental organizations, and ward councillors. Those affected shared the nature of this support saying:

“The social worker took us to the hall ... We also got counselling from faith-based organisations and the local councillor. The churches came to the hall to pray with us and this helped us emotionally and spiritually.” (P1)

“The social worker took us to the hall where community members donated food and clothing. People from the church also came with food, clothes and water. The local counsellor helped us a lot.” (P3)

“The church especially the Gift of the Givers gave us food, water, blankets and spongy beds to sleep on. Community members also came in with fresh bread and water. Some even gave us clothes. Some organizations also helped us a lot when we were at the temporary hall.” (P5)

“NGOs such as the Red Cross, UNICEF, Gift of the Givers and community members helped us with food, clothes, water, and beds. McDonald's and Spar shops gave us beans, bread and water. Clicks gave us toiletries. The social worker also assisted us a lot, as the local business people who also gave us food, water, shoes, clothes and blankets. Zion and Apostle church came to pray with us in the hall. This lessened the stress and the emotional burden of losing everything we had.” (P9)

These narratives highlight the considerable collaborative efforts made by various community networks. Social workers, the local councillors, faith organizations and other non-governmental organizations rallied together to offer diverse levels of material, emotional and spiritual support to affected communities. Participants corroborated earlier findings, related to how the faith-based organizations provided both food but most importantly spiritual support. Social workers appeared to have played a significant role in facilitating the move of affected families to community shelters. Non-governmental organizations such as the Gift of the Givers, the Red Cross, and UNICEF came together to provide food, blankets, water, and toiletries. Supported by local businesses, they were collectively instrumental in the early stages of disaster recovery to bring much needed material support to families who were left destitute.

In addition to the roles played by these organizations, local councillors also played a significant link between the communities that were affected, and the support services being offered. Participants described the help they received from the ward councillors as follows:

“The local councillor took us to the hall, where people from the community donated food and clothing. ANC comrades also came with food, clothes and water.” (P27)

“The ward councillor gave us food and school uniforms for the children. The councillor took us to the church, where we stayed for 2 months. There are NGOs

that came with the ward councillor, who also helped us with water, spongy beds and blankets. Community members helped me to rebuild the house. Some gave me roof tiles and bricks, and my mother also used her money. The church also gave us clothes.” (P30)

As evidenced local government officials contributed to helping the community by providing them with water and beds. What was significant however was that community members supported families who had lost their homes, by helping them to rebuild their homes by providing them with bricks and tiles. The data gathered is supported within a report published by the Department of planning, monitoring and evaluation for South Africa, which documented the support provided to individuals and families affected by the floods. The efforts by schools, churches, mosques, NGOs to distribute food, water, and clothes was also noted (Department of planning, monitoring and evaluation South Africa 2023: 25). Ngcamu (2023: 4) indicated that non-profit organisations such as the Red Cross were involved with the provision of relief and aid following the floods.

A scoping review conducted by Mudefi (2023: 8) further detailed the organizations who assisted during the April 2022 floods, such as monetary donations from civil society and the Democratic Development Programme and various government departments including the South African Social Security Agency, which donated money for school uniforms and provided R5 million in social relief to 3000 people. Various agencies responded to the flood crisis, included the South African Police services air wing, diving units and search and rescue units and contributed to search and rescue efforts (South African Government 2022a). Private sector actors such as private security firms also helped with the evacuation of people trapped in flood waters (South African Government 2022a).

A report compiled by the South African Department of Planning, Monitoring and Evaluation (2023: 24), reflected that the South African National Defence Force were tasked to assist with search and rescue operations at the start of the catastrophic floods. The report supported the narratives in the current study, detailing that more than sixty non-governmental structures and organisations from the civil society sector,

had helped with donations of food and water, clothes, blankets and mattresses for sleeping and other essential items such as educational material for children.

There were however instances where participants believed that formal support had been lacking:

“I only got support from my community, especially my neighbours, through helping with the cleaning and removal of rubble. The councillor did not give us any support. The church did try, but it was very minimal.” (P29)

This narrative suggests that not all families received formal support. They were reliant on neighbours who assisted with clean-up operations and lamented the visibility of local officials. This however may have been due to the magnitude of the disaster, as most participants shared the enormous amount of support received from all sectors. It is therefore important that local government structures be cognisant of the substantial amount of support required at all levels, during future disasters, to ensure all receive support.

That there was not always help provisioned, was supported in a report from the auditor general on the use of relief funds for flood affected communities in KwaZulu-Natal and the Eastern Cape, during the April 2022 floods, in which the government’s reaction to the catastrophe was reported to be too slow (Auditor General South Africa 2022: 1). This report noted that only 6% of the budget that had been assigned for aid, had been spent by the end of July 2022 (Auditor General South Africa 2022: 11). Adamtey, Mensah and Kovor (2020: 10) also found in their study that whilst faith-based organizations in Ghana had the capacity in terms of skills, funding sources, members and the willingness to assist during disasters, there was little done by local government to support them.

The delayed actioning of responses from formal government structures, reflects a gap in the disaster response both for eThekweni and other areas of South Africa and reflects that the suffering of those most vulnerable were exacerbated, through this lack of a response. In the absence of formal support, however the tangible acts of the community, provided immense support. Jewkes *et al.* (2023: 8) also noted that during

the April 2022 floods, the community banded together, to assist those in need by providing shelter when their homes were destroyed. In an international context, Bergstrand and Mayer (2020: 13) who conducted a study on community cohesion, following the 2010 Deepwater Horizon oil spill in the Gulf of Mexico, which affected people in Florida and Alabama in the United States, found that neighbours worked tirelessly to support the recovery of the community. This is further evidenced in the subtheme that follows.

4.6.6.2 Sub-theme 2: Informal support received

The second sub-theme focused on the nature of informal support, that flood victims received from the community and neighbours. Participants shared their experiences of same as follows:

“My neighbours assisted with clothes and blankets.” (P28)

“My family was housed by our neighbour. Community members who are our neighbours gave us blankets, clothes and blankets. I also appreciate the love and help I got from my friends. They gave me food and clothes for myself and the child.” (P31)

“Neighbours also helped with counselling and just talking. The social chat helped with reducing stress.” (P32)

These narratives reflect the power of social support networks during times of crisis. As evidenced, those affected by the floods, received assistance and support from members of their community who provisioned them blankets, food and clothing. Moreover, the love and comfort received helped ease the emotional distress and the trauma of losing their homes and loved ones.

Bergstrand and Mayer (2020: 11) described the value of community cohesion, saying that their study had found that there was increased recovery amongst those who resided in a community that was socially cohesive. Moreno (2018: 1042) added that

communities are not passive victims of disasters, but act as active agents in helping, as they have local knowledge and support networks. In addition to the support of community participants confirmed that their personal religiosity helped them cope. This is discussed in the sub-theme that follows.

4.6.6.3 Sub-theme 3: Personal prayer and religiosity as a coping mechanism

The third sub-theme focused on how participants used their personal spirituality to cope. They said:

“I pray every day, and prayer really helps to cope with the loss and the situation. I was very stressed and depressed, but prayers are helping.” (P6)

“Although I don’t go to church, but I do pray every morning and night. After a prayer I do not think of many things I feel relieved and less burdened. I only trust God only now.” (P10)

“I prayed a lot, and God answered my prayers. I have a girlfriend who is eight months pregnant, and I prayed to God to save me for this unborn baby, and here I am. Also, prayer reduces stress.” (P33)

These narratives reflect the power of prayer in helping to ease personal distress and cope with trauma. Participants shared that despite not being overly religious, as they did not attend church frequently, prayer served as a pathway to God, as it helped them feel comforted and to thank this Higher Power who protected them through this calamity.

Lalani, Drolet, McDonald-Harker, Brown, Brett-MacLean, Agyapong, Greenshaw and Silverstone (2021: 9) supported the notion that spirituality and spiritual values were crucial protective mechanisms that had helped to build resilience amongst families who had to endure a natural disaster. Deak and Mengga (2023: 8) found a strong correlation between prayer and healing, in their study, saying that spiritual coping

activities such as prayer can play a role in the healing process. Moreover, traumatic experiences as seen in people with post-traumatic stress disorder, brings people closer to God and provides hope and strength in facing adversity. Callender, Ong and Othman (2022: 3645) noted in their study of immigrant and refugee Muslim women on prayer and mental health, that in trying times prayer had helped vulnerable people by promoting their well-being and increasing their faith. Goodwin and Kraft (2022: 13) however suggested that whilst faith-based practices can help cope with traumatic conditions, there remains a need for mental health care to support recovery.

4.7 Conclusion

This chapter presented the data, and a critical analysis of the findings made in the study. Six themes emerged together with twenty-four sub-themes which captured the journey of both flood victims and faith-based leaders in relation to the April 2022 floods. They reflected the considerable devastation experienced by families and the invaluable role of faith-based organizations, community and local government in supporting their recovery and in rebuilding their personal life and homes. The chapter that follows, presents the conclusions reached and the recommendations made for further research.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The aim of the study was to explore the effects of the April 2022 floods, on individuals, families and communities. A qualitative case study approach, was used to understand how diverse communities shaped by their varying socio-economic contexts, experienced both the physical destruction and psychological distress, caused by the disaster. In addition, the study explored the role of faith-based organizations during and after the floods. This chapter presents the major conclusions of the study, in relation to the key objectives and the limitations of the study. It will also make recommendations for practice and policy, particularly in relation to disaster preparedness, psychological support for flood victims and for future research.

5.2 Major findings of the study

The study provided important insights into the effects of the April 2022 floods on those living in a semi-rural area, an urban area and an informal settlement in the eThekweni district. It revealed the extent of the physical damage sustained by the households, as well as the social and psychological effects that flood victims and their families endured. The study also offered insights into the role three different faith-based organizations played, in offering spiritual and material support during the flood and the contribution they made to both their immediate relief and long term recovery, post the disaster.

5.2.1 The experiences of individuals and their families during the floods

The first objective sought to understand how individuals and their families had experienced the April 2022, floods in KwaZulu-Natal. The study found that participants were affected by the floods in a multitude of ways. Many were asleep and were consequently caught unaware of the impending dangers, prior to the flood. This severely limited their ability to respond quickly, thereby increasing the risks they faced. Percival, Gaterel and Teeuw (2018: 5) made similar findings in their study, asserting

that the vulnerability to flood related risks and fatalities increase, when natural disasters occur at night, when people are asleep. Participants in the current study, were awakened by the encroaching flood waters, and began to experience considerable levels of fear, anxiety and trauma due to the rapid destruction of their homes. A study by Fatima and Rana (2017: 4) similarly found that people who were in their homes, when the flood event occurred experienced substantial levels of helplessness and hopelessness due to the destruction of their belongings.

In terms of the damage to homes, the study found that those homes which were poorly built, and made of materials such as tin, mud and wood were more vulnerable. This was especially true, if they were built in low-lying areas and near riverbanks which were prone to flooding. The damages occurred mostly in the Tongaat area and the Crossmoor informal settlement. Kawasaki, Kawamura and Zin (2020: 4) corroborated these findings, saying that people from lower socio-economic groups who could not afford proper housing and resided in vulnerable homes in flood prone areas, were more prone to the effects of flooding. Msasa and Manda (2025: 15) found that the topography of the home and the material that the home was constructed of, contributed significantly to the physical impact on the home during a disaster such as a flooding event.

In terms of the loss of belongings and documents, the study found that the floods had left many of participants with significant material losses, which included furniture, bedding, clothes, food, medicine and important documents such as identity documents, hospital cards and certificates. These losses not only had considerable practical ramifications, but the loss of items of sentimental value, affected the participants emotionally. This notion was supported by Adams and Nyantakyi-Frimpong (2021: 5) who reported that the damage and destruction of hard-earned material due to a flood event, resulted in adverse mental health outcomes for those affected. A study by Blake, Rijnink, Lyons and Aspin (2024: 8) found that the lack of access to medication and health care was due primarily to infrastructure damages, particularly that of the roads. Hence people with pre-existing socio-economic vulnerabilities, endured huger consequences especially where they could not access healthcare.

Not only were adults affected, but the study found that many children had to cope with the loss of their school books and uniforms, thereby impacting their school attendance. This caused both them and their parents to become anxious with regards to their academic journey. In this vein, Huesler (2024: 29) argued that disasters hinder school attendance causing a decline in academic achievement thereby indirectly impacting children's future educational attainment and economic growth. Hebebcı (2023: 1) therefore opined that the disruption of school life, post a natural disaster, results in cumulative psychological and social effects, especially in under-developed communities. These findings suggest that the loss of materials required for school children could affect their academic performance and emotional wellbeing.

Those who ran small businesses from home experienced the destruction of their business equipment, which impacted their income and livelihood. This consequently impacted their immediate and long term financial and mental health, as these individuals were reliant on same for their income and employment. Sadeghi (2022: 1) similarly reported that small businesses were very vulnerable during flood related events and experienced infrastructural damage and a loss of crucial assets. Karim, Al-Mamun, Eva, Ali, Kalam, Uzzal and Das (2024: 12) further highlighted the correlation between poor mental health and a loss or decline in income following a natural disaster. The impact on informal businesses, was also documented by Hewawasam and Matsui (2023: 16) who reported that such businesses experienced greater damage and losses, as they had no insurance plans, had limited higher education qualifications and knowledge of evacuation drills. This suggests that the damage incurred due to the floods, affected people's immediate earnings and also impacts their long-term financial recovery.

Another significant finding related to the impact of the floods on vulnerable households, particularly those already experiencing socio-economic hardship. Single-headed households especially those led by women who had lost their jobs, were more vulnerable to the effects of floods, as they faced compounded challenges. The responsibility of having to provide for their children, coupled with the loss of their homes and belongings added to their emotional distress. Christian, Dovie, Akpalu and Codjoe (2021: 8) supported these findings, saying that female headed households

often lack access to economic, logistical and social support and require more assistance following a disaster. These findings are aligned with the views of scholars who have argued that vulnerability is not only shaped by the disaster, but by pre-existing inequalities (Turesson, Pettersson, de Herve, Gustavsson, Haas, Koivisto, Karagiorgos and Nyberg 2024: 2; Biswas and Nautiyal 2023: 7).

The study also sought to understand how communities were affected during the floods. One of the key findings was damage to community infrastructure and utilities. The study found that damages to electrical infrastructure were widespread, resulting in blackouts in many of the flood ridden areas. Consequently, many households experienced a prolonged loss of electricity. Ye, Ward, Bloemendaal, Nirandjan and Koks (2024: 504) also noted that natural hazards posed a risk to the stability and functioning of the power infrastructure which in turn can cause significant financial losses and affect the delivery of health, education and essential services. In addition to the disruption to electricity, the study further found that households had endured limited or no access to clean water, as well as damages to the sewer system. This caused many participants to present with gastrointestinal illness. Mutil, Nasrin and Sharma (2023: 16) concurred stating that urbanisation coupled with rapid heavy rainfall places pressure on the sewage infrastructure, thereby resulting in sewer system failure, hazardous overflow and a potential threat to human health. Aziz, Wang and Mahmood (2025: 1) further argued that aging sewage infrastructure in urban areas, is prone to failure especially after heavy rainfalls. These findings underscore how climate change induced natural disasters and damaged infrastructure, jointly contributes to increased health risks and underscores the need for urban planners to improve drainage systems, in areas of increased population growth.

5.2.2 The physical and psychosocial effects of the floods on individuals and families

The second objective focused on exploring the physical, psychological and social effects of the floods on individuals and their families. The biopsychosocial model which was used as the guiding theoretical framework, was used as a lens to understand the intersection between the social, psychological and biological factors

and how they impact the experiences of participants during and post a flood. The biological or physical aspects reflected the physical health sequelae, emerging from the flood. Injuries and infections, as well as the loss of essential medication were some of the factors intersecting with the physical aspects of the participants lives. The social component underscores the social isolation that participants experienced, after they lost their homes and the adverse social experiences they encountered in their shelter. These social factors exacerbated their mental health vulnerabilities and impacted their family life and integration into society. The physical and social factors were found to coalesce into a range of mental health sequelae, ranging from emotional distress, anxiety, fear and deep levels of trauma post the floods.

In terms of the physical effects, the study found that bodily injuries, were a direct consequence of the floods, particularly where participants were endeavouring to flee. The injuries sustained by the participants, occurred through contact with submerged debris notably sharp metal and pieces, that had become dislodged from the materials used to build their shacks. Ratuliu, Geneo and Tiwatu (2023: 5) similarly noted that many injuries caused by floods, were due to sharp and blunt trauma. These findings suggest the systemic vulnerabilities in terms of disaster preparedness and poor evacuation procedures, thereby exposing many victims to the risk of bodily injuries.

Given that the flooding occurred late at night, many participants could not access immediate medical assistance. Several participants were found to present with acute respiratory illnesses in the days following the flood. Their symptoms included a fever and cough, which later progressed to bronchitis, thereby requiring medical treatment. Landaverde, Généreux, Maltais and Gachon (2022: 10) also found in their study, that the floods were linked to the poor respiratory health of victims. This study also found that exposure to rain, emergency evacuation and displacement during the floods, prevented participants from accessing certain essential medicines, which was detrimental to those with chronic respiratory diseases, such as asthma. Consequently, participants began to experience asthmatic attacks, as they could not retrieve their inhalers. This resonates with findings from a study by Peirce, Espira and Larson (2022: 11), who found that extreme weather events exacerbated existing respiratory conditions and contributed to the risk of developing asthma. Those with hypertension,

particularly the elderly, began experiencing headaches and chest pains post the flooding event. This was possibly related to the increased stress and tension due to the flood. These findings cohere with those in other studies, such as those by Babaie, Naghipour and Faridaalae (2021: 6), who noted that the prevalence of cardiovascular diseases increased after a natural disaster, due to the physical and mental stress of the flooding event, especially the loss of homes, friends, loved ones and their consequent displacement. These findings imply that the physical effects of the flood were compounded by the psychological strain and the disruption to routine treatment protocols within vulnerable populations.

Of significance, however, was the loss of lives during the flood. Participants were distraught at drowning related deaths in their communities. This highlights the life-threatening nature of flood events, especially in areas that lack early warning systems and safe evacuation procedures. Sindall, Mecrow, Queiroga, Boyer, Koon and Peden (2022: 4) supported these findings, saying that drowning during a flood was a leading cause of death in flood affected communities, with the hugest impact on low and middle income countries. This supports the need for risk reduction strategies and disaster preparedness measures especially in high-risk communities.

In terms of mental health sequelae, the study found that many participants had experienced acute emotional distress, both during and after the flooding event. Significant levels of anxiety were evident, as participants shared their fear of drowning and their fear of losing their children and loved ones during the flood. Basistha, Paul, Ali and Saikia (2024: 4) and Sharpe and Davison (2021: 7), also observed a positive association between people who experienced a natural disaster and the development of mental health disorders, such as anxiety, stress and fear. In this study, the participants reported that the fear they experienced during the flooding endured well after the flood, with participants describing persistent feelings of uneasiness, whenever there were heavy rains. These findings were supported by Basistha *et al.* (2024: 2) and Lamond, Joseph and Proverbs (2015: 3) who found that flood survivors had experienced long term psychological effects such as anxiety, fear of death and powerlessness. These pervasive psychological effects reflect the lasting mental health consequences of natural disasters.

Another key finding was the prevalence of sleep disturbances, flashbacks of the floods, nightmares, sadness and depression, all of which reflect post-traumatic stress disorder. Bhutto, Suyuhan and Vighio (2025: 7) argued that a flooding event had multifaceted psychological effects, thereby causing deep psychological scars especially amongst vulnerable populations. Basistha *et al.* (2024: 4) also described the negative relationship between psychological distress and the quality of life, arguing that increased mental health distress is linked to reduced quality of life amongst disaster survivors. These findings affirm the need for on-going mental health interventions, to be implemented particularly amongst vulnerable communities. The financial losses experienced together, with the loss of their homes, also aggravated their psychological distress. According to Karim *et al.* (2024: 13) socio-economic factors, displacement and the loss of income plays a significant role in the development of mental health conditions. These findings cohere with the theoretical underpinnings of the biopsychosocial model, which supports the notion that the physical, social and psychological factors are intertwined and that they reciprocally influence each other.

5.2.3 Impact on the physical circumstances of flood victims

The third objective was to inquire how the physical circumstances of participants were affected during the floods. The study found that due to the severity of the floods, participants in vulnerable areas, were moved to temporary shelters, within community halls. Other researchers reported that evacuation is an effective way of managing flood events, especially in urban areas (Qiu, Tan, Yuan, Lv, Wang, Cao and Zhang 2024: 151). Some of the shelter locations identified include schools, community centres and religious organisation venues (Jamrussri and Toda 2018: 12). Ahmadi, Karampourian and Samarghandi (2022: 2), stated that emergency evacuation is crucial to moving people from high-risk areas to areas of safety, to protect their lives and health. These findings indicate that the use of temporary shelters such as community halls although a necessity, reflect a gap within disaster response plans.

Social and religious organizations were found to generously open up their halls to act as temporary shelters for flood victims. Along with other stakeholders, they began

provisioning them with essential items such as food, blankets and mattresses, during their displacement. This finding reflects those made by Fallah and Hosseini Nejad (2018: 45), who found that non-profit organisations had provided humanitarian aid before and after a disaster to those who were affected and that these organisations, had filled a gap within the disaster response plan, by enabling evacuation, and providing shelters and basic relief necessities all of which are critical within disaster response strategies.

The study found that these shelters were overcrowded, thereby creating additional stress on individuals. This soon led to unhygienic conditions, as entire families, that included men, women and children began living in one hall, sharing a densely populated common space. High levels of noise, drinking, and in house fighting escalated amongst the inhabitants, which led to sleeping and safety issues. Kim, Kim and Kim (2021: 13), found that sanitation, safety and privacy were some of the requirements, for a temporary emergency shelter, in order to ensure a stable living environment for survivors of disasters, to regain their physical and mental health. Ahmadi *et al.* (2022: 5) further mentioned that inadequate emergency accommodation poses a challenge for emergency evacuation and requires the coordination of multiple stakeholders.

One key finding emerging from the current study was the vulnerability of women in shelters. The study found that women in shelters had become increasingly concerned, with regards to their safety, due to the shared living space and reports emerging from other shelters of incidents of physical and sexual assaults on women. The vulnerability of women presented in this study is consistent with findings by Ullah, Haijun, Shah, Alotaibi and Rauf (2024: 9), who reported that during flood disasters, women are more vulnerable to sexual and physical violence, particularly if they were residing in crowded and poorly secured emergency shelters. Similar findings were also reported by Memon (2020: 14) who stated that the emotional, physical and sexual violence levelled against women by family members and strangers, were common in emergency shelters. These findings indicate that the displacement of women during disasters leads to potential abuse and reflects the dangers of shared living within shelters. These findings

underscore the need for more effective protection strategies to be put in place, within such spaces, by disaster management authorities.

Another finding was that many participants experienced poor physical health, due to a lack of hygiene and sanitation within these confined spaces. This caused many to experience diarrhoea, vomiting and stomach aches, which may have arisen from, drinking contaminated water and also due to unsanitary conditions. Similar findings were found by Akaishi, Morino, Maruyama, Ishibashi, Takayama, Abe, Kanno, Tadano and Ishii (2021: 7) who observed that inadequate sanitation services and lack of access to clean drinking water in temporary shelters, contributed to the spread of diseases and infections. These conditions compromised not just the physical health of participants but also added to the emotional distress felt by those displaced individuals. It was also revealed that the displacement and the conditions in the shelter, had consequently impacted on participants, leading to added sadness, depression and anxiety. These findings cohere with those made by Gul, Khan, Nisar, Ali and Ullah (2024: 12), who reported that survivors who were residing in emergency shelters had suffered with depression, anxiety and fear. Similarly, Schnall, Hanchey, Nakata, Wang, Jeddy, Alva, Tan, Boehmer, Bayleyegn and Casey-Lockyer (2020: 11) reported that the mental health of evacuees was affected, causing them to present with emotional symptoms, agitation and disruptive behaviour.

Moreover, the lack of food, within some of the more permanent shelters, aggravated this psychological distress, particularly for those who had no employment or source of income. This finding was similar to that of Onyeaka, Ejiohuo, Taiwo, Nnaji, Odeyemi, Duan, Nwaiwu and Odeyemi (2024: 6) who found that food insecurity and poor mental health, was linked to and exacerbated by natural disasters. Fitzpatrick, Willis, Spialek and English (2020: 9) found that people who were displaced following a natural disaster, were twice as likely to suffer with food insecurity than those who were not displaced.

In terms of community support provided to afflicted individuals, families and communities, the study found that the formal and informal support provided by various organisations was crucial. Support was provisioned by community networks, organizations, social workers, non-governmental organizations, and ward councilors.

This is consistent with the views of other scholars who asserted that multiple non-government actors and informal network contributions in disaster response efforts had saved lives (Panebarco 2025: 10; Hesselman and Lane 2017: 9). The study found that various community networks had collaborated and rallied together, to offer immediate and diverse levels of material, emotional and spiritual support to affected communities. The informal support of friends and neighbours especially, within urban areas, through donations of clothes and blankets, had went a long way to ensure the comfort and well-being of those who had been displaced. Even just emotional support, through engaging with those who were affected, had helped ease their plight. This reflected the power of social support networks during times of crisis. These findings resonate with those made by Chapagain, Hochrainer-Stigler, Velez, Keating and Mechler (2025: 12), who highlighted the importance of community networks and resilience in decreasing the impact of flood events. Their research showed that rural areas with strong community participation and solidarity had better outcomes post flooding. In contrast, urban areas with better post flood outcomes tended to have stronger financial capacity, including effective government resource management and the presence of private sector actors, such as businesses who were able to resume operations and recover from disruptions. Together these findings highlight the importance of social support and community capacity efforts in shaping the recovery of people and communities post a flood.

5.2.4 Role of faith-based organizations in supporting families

The fourth objective focused on the role of faith-based organizations in supporting families and communities during the floods. One key finding was that the faith-based organisations, had provided humanitarian assistance to families across all religious backgrounds. Members of all three faith-based organisations indicated that their religious faith, had not precluded them from serving and supporting others regardless of their religious background. This finding is supported by other scholars, who argued that humanitarian aid provided by faith-based organisations, were often provisioned to all, regardless of race, ethnicity or religious background (Harpai 2020: 3). Hence the desire to help was premised on their religious teachings and the religious values to

serve those in need (Cornelio and Teehankee 2024: 134). Collectively this exemplifies the central role of faith, in guiding humanitarian aid within affected communities.

In terms of the support provided, the study found that faith-based organisations, provided physical and material support to displaced families. They did this by opening up their religious halls as shelters, providing hot meals, tea, water, bedding, mattresses and clothing. Participants were able to access the utilities within these organizations, such as the kitchen, gas stoves, kettles, and cutlery, with some religious organisations housing those displaced, for up to eight months. Cornelio and Teehankee (2024: 134) and Moslehi, Dehghani, Masoumi, Sheikhi and Barghi Shirazi (2023: 228), similarly found that faith-based organisations had played multiple critical roles in disaster preparation, response and recovery and had alleviated the suffering of survivors.

In this study, it was not an objective to examine the decision-making processes, coordination challenges and sustainability. The faith-based leaders were recruited rather to shed light on the objectives of the study.

The study showed that the decisions within the faith-based organisations were guided by a mixture of theological principles and practical challenges. In this study the faith-based organisations represented three different religious faiths and across all three organisations the common cosmology of providing humanitarian aid to people in need, irrespective of their race or religion, was shown to be a spiritual and moral obligation that was embedded in all of the organisations function. This cosmology provided the basis for the organisations decisions. Hence, when the flood disaster struck all three faith-based organisations responded to their communities needs immediately and without hesitation.

However, despite the embedded provision of humanitarian aid to people in need, the faith-based organisations faced challenges in actioning the provision of aid. The Hindu faith-based organisation approached sponsors for donations, members used personal funds and private vehicles and the congregation went door-to-door to collect donations from the community. The Muslim faith-based organisation approached other organisations for donations to enable them to provide cooked food and bread to

affected people. The Christian faith-based organisation also approached businesses and received aid from political parties. The reliance on congregation members, community members and external contributions indicated that the decisions made by the faith-based organisations were under conditions of limited institutional resources. The combination of religious moral codes and rapid resource mobilisation from the organisations suggested a decision-making process that was shaped more by spiritual duty and the organizations' presence in the community and less by established procedures for disaster management.

Across all three organisations coordination of activities was as a result of the organizations' efforts rather than established disaster management structures. This indicates that the coordination was reactive and shaped by who and what was immediately available. However, although these efforts may have provided relief and aid to the vulnerable populations, it also created vulnerabilities in sustainability due to the reliance on temporary partners such as faith-based organisations, as their support was limited to supporting the immediate crisis.

Another critical finding was that faith-based organisations had offered flood affected people spiritual support in the form of scripture reading, prayer, counselling and mediation to support their psychological recovery, foster hope and process their grief over the loss of their homes or loved ones. According to Sohrabizadeh, Jahangiri and Khani Jazani (2018: 817) social and religious support offered to disaster victims enables the restoration of hope and normal life post disaster. Their study also showed that this support improved the mental health of survivors and increased their recovery after a disaster. The communal efforts of these faith-based organisations, revealed the critical role of both social and spiritual support in promoting wellbeing and that these groups not only met basic survival needs but also facilitated spiritual wellbeing.

Of relevance, was that faith leaders, were of the view that the response to the disaster was slow, which affected the evacuation of those at risk. They believed that a more structured and proactive approach was required to facilitating evacuation during future disasters. They supported the need for early warning systems, to facilitate the evacuation of people in flood prone areas. This was supported by Peden, Mayhew, Baker, Mayedwa and Saunders (2023: 1) who reported that the lack of government

support was a challenge to flood mitigation and support. Ahmadi *et al.* (2022: 5) stated that the lack of early warning signals and late flood notifications had contributed to an increase in mortality. These findings exemplify the critical issues influencing disaster preparedness and coordination.

5.3 Key conclusions

The 2022 floods which besieged eThekweni caused immense destruction, leaving many people injured, lives being lost, thousands displaced coupled with the loss of homes and businesses, and damage to roads, electrical and water systems. Many of the communities within the eThekweni district were however already vulnerable due to their existing socio-economic status.

Engel's biopsychosocial model (Bolton 2023: 7505), which guided this study provided a holistic framework, to understand the interconnectedness between the physical, psychological and social domains, as it intersected with participants within the context of the flood. The model was developed to deepen an understanding of the interplay between the biological, psychological and social aspects of health and formed a valuable framework to understand the multifaceted effects of the flood. It allowed for a deeper understanding of how familial, spiritual and other socio-economic variables influenced those caught within the milieu of the flood. The themes that were derived from the study, interfaced synergistically with the biopsychosocial aspects, underpinning the holistic model and can serve as a valuable lens, through which various interventions and strategies related to the physical, mental and social aspects can be developed to enhance disaster recovery.

The study was located within three settings, namely semi-rural, urban and informal settlements. It found that those within all three settings, experienced physical harm such as injury, sickness and a worsening of their chronic health conditions, the emergence of increased mental health distress such as anxiety, fear, sadness, depression, as well as social disruption, as evidenced by the displacement of families who were uprooted rapidly from their community settings. These findings cohere with other studies such as those by Rufat, Comby, Lhomme and Santoni (2025: 40) and

Deng, Friedman, Ryan, Zhang, Dong, Rodriguez, Yu, Huang, Nair and Luo (2022: 6), who attributed the effects of flooding disasters to their physical or psychosocial well-being. The study however documented the holistic effects of the floods on the physical, mental or social well-being of participants. This was reflected in their inability to access medication, which caused anxiety, and through their being displaced from their communities, which led to feelings of isolation and depression.

The study further revealed the importance of understanding those affected holistically. This ensures a comprehensive, multifaceted approach to disaster support and recovery, thereby ensuring that those affected have their biopsychosocial and spiritual needs met. The biopsychosocial model also highlights how the social determinants of health such as socio-economic status, unstable housing and community cohesion, impact disaster hit communities. Those participants from informal settlements and low-income backgrounds appeared to be more severely affected. The hardship linked to poverty, long term displacement and the lack of employment illustrates how social disadvantages, can be a precursor to poor health and well-being.

The support received by faith-based organizations extended the biopsychosocial aspects, to that of the spiritual, entrenching the importance of spirituality within the human experience. In the context of this study spirituality formed an important component of wellbeing, psychological comfort and social cohesion for many participants, as it offered hope, comfort and support amidst their fear, grief and uncertainty. It served as an important form of support in the absence of formal mental health services, for the participants. This supports previous studies, that found that effective recovery from a disaster, requires both material stability and a sense of subjective wellbeing amongst inhabitants (Blackman, Prayag, Nakanishi, Chaffer and Freyens 2023: 11; Papadopoulos, Lazzarino, Koulouglioti, Ali and Wright 2022: 2000).

In conclusion, the application of the biopsychosocial model, within the current study, helps to conceptualise the human experience of the disaster, as a multifaceted experience, where those affected, experienced diverse effects. Understanding the effects of the flood requires more than assessing physical damage and quantifying material losses. It also requires recognition of how individuals, families and communities live through and make sense of the disaster psychologically, socially and

spiritually. This perspective has implications for disaster preparedness and response strategies, underscoring the need for multidimensional intervention strategies that consider the physical, psychological, social and spiritual effects. Policy makers must be able to consider the physical recovery of people, their mental health needs, whilst strengthening the social support systems, that can enable their recovery. Interventions that occur in silo, that prioritize one aspect such as physical recovery efforts and which ignore other aspects such as the psychological and social impact, thwart the holistic recovery and well-being of those affected. The biopsychosocial and spiritual framework however creates an understanding of the holistic effects of flooding disasters in an urban metropolitan area, providing a foundation to design a holistic, multi-dimensional disaster management strategy.

5.4 Recommendations

The fifth objective of this study was to make recommendations, with regard to how families and communities could be assisted after a flood disaster. The recommendations that follow, emerged from the findings of the study and through the literature reviewed. The recommendations are organized according to the disaster management process entailing mitigation, preparedness, response and recovery to provide a comprehensive framework for reducing the impact on individuals, families and communities in eThekweni and improving resilience.

5.4.1. Mitigation

The recommendations that follow, focus on decreasing the underlying causes and potential effects of heavy rainfall, storms and floods.

5.4.1.1 Physical infrastructure and urban planning

The study found that many of the households, which were affected severely by the flooding, were from semi-rural areas and informal settlements, where poverty had limited both the quality of housing and access to basic infrastructure. The homes in these areas were constructed from metal sheets, tin and wood and offered little

protection against the heavy rains, such as those which occurred in April 2022. A number of homes, which were built in low-lying areas, near rivers and which are prone to mud slides, were washed away. The lack of proper drainage infrastructure worsened the effects of the flooding, with water pooling and flowing into homes causing damage. In some areas the flow of water, combined with mud and debris, gathered momentum, and forcefully destroyed and washed away homes in its path. The combined risk of poor housing, the risky location and failing infrastructure can result in losses, both materially and psychologically. The following recommendations can be made, based on the findings of the study and the literature.

Physical structure

- Safer construction of houses in informal areas should be supported. While houses with full compliance and which are coded homes may not always be possible, these households can be supported by using safer building techniques, through raising floor levels, building reinforced foundations and using more water-resistant materials. These projects should be supported through local training programs and small grants and material assistance offered by the municipality in collaboration with the help of businesses, through their corporate social responsibility initiatives.
- Authorities should give immediate attention to the housing infrastructure in flood prone areas that have been affected multiple times and support the move to creating more resilient infrastructure (Sen, Dutta and Kabir 2021: 20).
- Advanced building techniques and high-performance concrete, that offers durability and strength against natural disasters should be used (Dine and Gasmi 2024: 6).
- Financial assistance such as incentives or subsidies for the use of renewable energy sources such as solar power, that reduces the reliance on municipal energy and which ensures continued electricity during power outages caused by disasters should be promoted (Njogu 2021: 9).
- Road infrastructure should be assessed frequently, especially as urban areas expand. Areas that are high risk and exposure should increase road density that will improve accessibility of emergency services during flooding disasters to vulnerable communities (Lu *et al.* 2024: 9).

Urban planning

Urban planning is important to diminish the impact of natural disasters and improve resilience. The following should be considered:

- Develop an urban structure plan based on previous flooding events, integrating climate adaptation strategies to promote resilience. These plans must identify flood prone zones and essential urban functions to guide land use effectively (Neves 2024: 9)
- Install, upgrade and maintain drainage systems in semi-rural settlements, urban settlements and informal settlements. Install basic open channels, culverts or lined ditches. Regular cleaning by the municipality and community led cleaning and maintenance can reduce blockage and water accumulation.
- The forced removal of communities from informal settlements, located in flood prone areas, may be impossible. Hence urban planning should prioritise adaptable, green infrastructure approaches that integrate environmental restoration and community participation. For example, a green infrastructure project in Kenya enabled residents of informal settlements in flood prone areas to implement agricultural practices that controlled flooding, reduced erosion of soil and supported the local economy (Tillermuir, Carboni, Hotchin, Lal and Morrison 2025: 8).
- Artificial intelligence and machine learning should be utilized to predict future occurrences of disasters and recommend actions which will be useful information for informing policy and guiding sustainable urbanization (Agonafir *et al.* 2023: 7).
- Community voices should be integrated into urban and settlement planning. Residents of flood prone areas should not be treated as passive recipients of aid, but should be involved, in terms of conducting participatory planning processes, including warning systems and community awareness.

5.4.1.2 Improvement of temporary shelters

Whilst disasters are often unpredictable in their exact timing and scale, their occurrence within flood prone areas are a reality, especially in KwaZulu-Natal (Mudefi 2023: 1). It is therefore essential that government authorities engage in proactive and not just reactive planning, especially with the provision of temporary shelters. Some of the challenges highlighted in this study were linked to overcrowding, lack of gender separation, safety issues, sexual harassment, alcohol abuse and noise disturbances. Furthermore, displaced people were housed in these shelters for many months. These conditions compromise the safety and dignity of displaced individuals and families. The following recommendations are proposed:

- Design gender sensitive and family sensitive temporary shelters, with separate sleeping and sanitation areas for women, families and men where appropriate and possible.
- Implement codes of conduct and enforce safe shelter rules. For example, there should be clear rules prohibiting the use of alcohol, noise disturbances and sexual harassment. Trained shelter coordinators should be in place, preferably from local community organizations, to monitor and safeguard the well-being of all.
- Include trained personnel that are visible in the shelters, who can provide protection and psychosocial support, identify gender based violence and safeguard children.
- Involve displaced people especially women in shelter management decisions to empower residents and build trust and safe living conditions.

5.4.2 Preparedness

Preparedness involves planning and capacity building activities that enable people to respond effectively when there are heavy rains or a flood event. The following recommendations aim to improve preparedness.

5.4.2.1 Early warning systems and community awareness

The study found that many did not expect the rainfall to have such a substantial impact on their homes and families. According to Thoithi *et al.* (2022: 1), more than 30% of the total annual rainfall fell over a 24-hour period, in the eThekweni area. The lack of awareness however was not just due to the complacency of the community. In South Africa, whilst many people own mobile devices, access to Wi-Fi, internet and social media platforms such as Facebook and Twitter, where the weather bureau posts important information, pertaining to the weather patterns, is limited in socio-economically disadvantaged areas. In this context, relying solely on digital platforms that require internet access, excludes a large portion of the population, particularly in semi-rural areas and informal settlements. The recommendation then is that early warning systems must be grounded in the communication realities of low-income communities. The following are important recommendations that can be made:

- Develop multi-channel early warning systems that do not rely on internet access. The municipality should use widely accessible methods such as loud hailers, SMS alerts and mobile device alarms, community radio stations and in-person announcements at gathering points such as markets, schools, religious institutions. These methods ensure that populations without smartphones or data can still receive warnings timeously (Ringo, Sabai and Mahenge 2025: 2)
- Ensure early warning messages are simple and actionable. Weather alerts provided to the community via the municipality and the South African Weather services are in English and use a colour coded key, that requires a level of literacy and interpretation (eThekweni municipality 2025; South African Weather Services 2025). The recommendation is that these alerts be made in local languages, thus making it easy to understand. This includes instructions such as “move to higher ground immediately”.
- Regularly test and practice warning systems through drills and simulations should be effected, so that communities can familiarize themselves with the system, obtain knowledge and confidence, which are key to timely responses during a disaster. The study found that despite the constant rains, people went

to bed without awareness of the potential risks or the need to evacuate until their houses were flooded.

- The use of schools, churches, mosques, temples and local organizations for information dissemination, is important as they are accessible and can serve as trusted messengers, who can deliver salient information, in the local language. In this way such messages can be understood and taken seriously. This recommendation follows the principle of leveraging existing social structures to improve disaster communication.
- Ensure that the early warning system reaches vulnerable people such as elderly people, informal settlements and people with disabilities.
- Link early warning systems to actionable response plans such as emergency exits, evacuation routes, places of safety and shelters.
- Work with universities to develop machine learning techniques that develop early warning systems based on risk assessments and can facilitate the implementation of prevention strategies, evacuation strategies and resource mobilisation (Abdullah and Sofyan 2023: 4).

5.4.3 Response and recovery

Response entails the efforts undertaken to protect the lives of those affected, to meet their basic needs and to support them following a flood event. The following recommendations aim to improve the disaster response activities.

5.4.3.1 Mental health services

The study further found that participants and their loved ones endured immense psychological distress, throughout all stages of the flooding event. They experienced high levels of anxiety and fear, as the rain continued for hours and people began to become concerned whether their homes would withstand the rainfall. When the flooding began, their feelings of panic and distress intensified and continued as they moved to temporary and semi-permanent shelters. Moreover, mental health services were neglected during disaster response interventions, despite the considerable psychological distress that was experienced by participants. The recommendations

below are grounded in the findings of this research and disaster mental health research.

- Integrate mental health support into basic trauma relief activities and disaster management policies (Rahman, Shobuj, Hossain, Alam, Islam and Hossain 2025: 8). Psychological support should support medical or physical care interventions. Identifying psychological distress and offering psychosocial first aid should be part of the intervention efforts of all disaster response teams, mobile clinics, primary care clinics, hospitals and evacuation and displacement centers. This is linked to the World Health Organizations mental health action plan, which advocates for mental health services and psychosocial support to be embedded within emergency response and recovery systems.
- Train community health care workers and volunteers from faith-based organizations, in basic psychosocial counseling and support. Given the limited number of social workers and mental health professionals, in resource poor settings such as South Africa, it is important to capacitate community members to extend their reach of support. This training should include how to identify, how to respond and when to refer people with signs of post-traumatic stress disorders.
- Incorporate psychoeducation via community programs and non-governmental organizations, on how to cope after a disaster. This will help make people more resilient and promote calmness and less anxiety (Ameruddin, Berezina and Yap 2025: 15).
- Targeted mental health recovery interventions should be developed (Rahman *et al.* 2025: 8), particularly for vulnerable populations such as people from poor socio-economic backgrounds, elderly, children and adolescents.
- Long term mental health services for those displaced by floods should be provisioned (Yodsuban and Nuntaboot 2021: 414). This study showed that people who were displaced, lived in temporary shelters such as community halls for lengthy periods, sometimes up to eight months. Those in long-term shelters have been there for several years and their mental health issues, linked to same, cannot be overlooked. Continued access to counseling, support groups and referrals to more specialized mental health services are crucial,

especially for children, the elderly and those with pre-existing mental health conditions.

- The study showed that unemployment and lack of financial stability contributed to poor mental health. Therefore, programs that include vocational training and microfinance should be included in disaster management strategies to reduce economic vulnerabilities caused by the disaster (Rahman *et al.* 2025: 8).

5.4.3.2 Community support systems

The study showed that after relocation, people had difficulties connecting with their new social networks and communities. Community support systems are an important component following disasters, as they provide systems for immediate relief and social support, that formal services alone cannot offer. The following recommendations can be made:

- Authorities to include community leaders in disaster management strategies, especially in preparedness and emergency relief, as it is the leaders in communities who can improve communication to residents and facilitate participation of other organizations in the community, in relief and recovery activities (Atanga 2020: 11).
- Social networks through local forums with disaster victims should be strengthened to facilitate discussion on flood preparedness and recovery strategies. Being part of a social network such as participating in local meetings or simply sharing a space with others who have had a similar experience, can help people to feel less isolated and reduce their mental health burden.
- The need for spiritual and community support systems during and after a disaster should be acknowledged by authorities. Support of these systems should be included in disaster management plans (van Straten and Ncube 2023: 4).
- Faith based organizations should be included in the community support system. Religious gatherings such as attending a church service, may help individuals and families to make sense of their loss and trauma.

5.4.3.3 Social support organizations

Social organizations such as humanitarian non-governmental organizations are crucial in disaster response and relief activities. This study showed that these organizations assisted the community in responding to recovery and evacuation and the provision of necessities. The following recommendations relate to improving the support provided:

- Authorities to include social support organizations within disaster management strategies, as these organizations work in communities, are flexible, have resources and are quick to respond to disaster events (Chen, Zhang, Wang, Wang, Cao and Chen 2024: 2).
- Map the organizations in each ward within eThekweni and the services they provide to utilize the strengths and resources of each type of organization effectively.
- Work with ward councilors, faith-based organizations and authorities to set up warehouses during flood prone seasons, stocked with essential items and non-perishable food.

5.4.3.4 Faith based organizations

The study found that faith-based organizations are usually the first responders in their community, when a disaster strikes, as they are able to provide tangible assistance to people, that need evacuation and to people who are displaced. In addition to meeting the physical needs of people displaced, they also offer counselling, prayer, spiritual care. In the aftermath of a natural disaster that has a wide scale impact, the provision of trauma and stress counselling, to all people affected is rare (Okyere *et al.* 2024: 497). This study documented how faith-based organizations fill the gap and provide counselling to affected people that they provide aid to. Strengthening the capacity of these organizations can enhance their effectiveness, safety and access to support, in resource constrained environments. This can be done through their:

- Inclusion within disaster management strategies (Okyere *et al.* 2024: 497), thereby ensuring a coordinated and integrated emergency response.

- Training in emergency response and needs assessment. Such training should include skills in rapid assessment, crisis communication, resource management, referral protocols and counselling. This will allow them to coordinate more effectively with municipal disaster relief management departments.
- Training in psychosocial support and how to support individuals experiencing acute distress to complement the informal counseling they are providing.

One of the challenges highlighted in this study was that faith based organizations use their own limited resources, (such as money, fuel, vehicles, halls) to provide aid post disaster, within a community. This is not sustainable without additional support. To address this the following actions are recommended for authorities.

- Provide financial and logistic support to faith-based organizations during the initial phases of response such as fuel subsidies, vehicle access and communication tools (Negi 2022: 3).
- Develop mechanisms to reimburse faith-based organizations for critical interventions provided in the initial response.
- Ensure timely transition of assistance provided from faith-based organizations such as temporary housing to authorities.
- Unlike other organizations who leave once the initial emergency response is provided, faith-based organizations are based in the communities. This positions them well to support long term recovery and resilience of community members. Authorities should include faith based organizations, within post disaster funding streams.
- Faith-based organizations are driven by religious and ethical drivers, which allows for strong volunteer commitment. These organizations and volunteers should be recognized within government briefings to build public awareness and trust.

5.4.3.5 Establish rapid response protocols

The study further suggests that the response from the local authorities and government was too slow. Establishing rapid response protocols will improve the speed, coordination and effectiveness of immediate response interventions. To address this:

- The local government should co-develop response strategies with organizations in the community and local emergency teams. These protocols should include clear communication chains, designate contact persons and create predefined roles for immediate action, when severe weather alerts are issued. This recommendation highlights that community structures and organisation's can help bridge the gap between the onset of a disaster and the arrival of formal services. Practically this may entail equipping local churches, mosques and temples, with basic emergency supplies and training.

The report from the auditor general with regards to the flooding event indicated that the government's response to the flood was too slow, due to the lack of coordination between the eThekweni municipality and the government departments; a lack of capacity, insufficient project management, poor monitoring and an unprepared government, which resulted in a poor disaster response (Auditor General South Africa 2022: 4). The following recommendations can be made:

- Revise protocols to ensure clear lines of responsibility and communication between national, provincial and municipal departments for pre-disaster, response and recovery stages.
- Introduce monitoring systems that monitor contractors that need to complete infrastructure projects, to ensure timely and quality of projects (Auditor General South Africa 2022: 4).
- Create formal processes that evaluate the response to previous disasters, capture lessons learned and incorporate these findings into updated disaster management policies and training material.

5.5 Recommendations for future studies

Further research should extend itself to other geographic areas in South Africa. This will shed light on the challenges in other areas. As this was a qualitative research study, the use of other methodological approaches, may assist in collecting pertinent quantitative data related to natural disasters.

Future research should also consider a longitudinal approach to tracking medium- and long-term impacts of displacement on individuals, families and communities, to provide insight into recovery, the psychological effects and sustainability of coping strategies. More attention can be paid to informal social networks and local knowledge systems that support disaster recovery efforts, as these mechanisms operate parallel to or in the absence of formal responses. Studies also need to be conducted on the introduction of early warning systems and the implementation and benefits of early warning systems. Future studies should also address the impact of flooding on urban metropolitan areas, particularly in relation to broader climate change challenges and urban planning.

5.6 Contribution of the study

The significance of a study is defined by Hiebert, Cai, Hwang, Morris and Hohensee (2023: 107) as the potential to contribute to improved learning opportunities, by reflecting on the importance of the problem, posing meaningful questions that pertain to the area where the study is conducted and to the individual study case. Flooding events are increasing in occurrence both globally and in South Africa, driven in part by climate change and rapid urbanization (Grab and Nash 2023: 476; United Nations 2020: 10).

This study's main contribution is that it looked at the physical, social and emotional effects of the April 2022 floods in eThekweni, on those who were affected by the disaster. By centering the study on individual experiences across three different settings, namely semi-rural, urban and an informal settlement, this research provides a multifaceted perspective of the experiences of people to the disaster and recovery.

This is especially valuable in a metropolitan that has such demarcations and socio-economic disparities.

One of the studies key contributions lies in its documentation of the lived experiences of the flood and its physical and psychosocial effects on people which is often underrepresented in disaster literature, that tends to rely on quantitative or government led reports. As a qualitative study that uses the voices of individuals from the communities affected by the flood, this study adds to the growing knowledge, that appreciates the importance of local contextual knowledge.

By incorporating faith based organizations into the study, this study also makes a unique contribution by examining the role of these religious organizations in natural disaster response efforts in South Africa. While the involvement of religious organizations in humanitarian crises has been documented globally, there is little empirical research on how faith-based organizations operate in South Africa, in urban and semi-rural contexts after natural disasters. This research offers insight into how Christian, Hindu and Muslim faith-based organizations respond to community needs and provide material and spiritual support.

Moreover, this study contributes to theoretical discussions on the interaction between the physical, social and psychological dimensions and how it impacts affected people after a disaster. This study has also contributed to understanding that disaster recovery plans need a multi-dimensional approach, that incorporates not only physical aid and housing, but also psychological and spiritual support as well. This study, therefore has the potential to inform and transform disaster recovery policies and plans. The recommendations made in this study can assist both the people who are likely to be affected by floods, as well as disaster relief departments in the government structures.

5.7 Limitations of the study

During the study there was an awareness that there were vulnerable populations. This was addressed under the ethics section. The researcher's professional background as

a health care worker, who worked in resource limited rural settings offered a familiarity with the social and structural conditions in which the participants lived. Additionally, the researcher spent time before the interview building rapport with the participants. The researcher also emphasized the voluntary participation and the right to withdraw at any time. The researcher used open ended questions to decrease the pressure during the interview.

Another potential limitation was the risk of losing subtle meaning between English and isiZulu. To mitigate this risk, the interpreter repeated the question and discussion in the vernacular as needed. The interpreter also translated to English if it was required. The researcher himself is familiar with the isiZulu spoken language. The English translations did not focus on a direct word substitution but also preserved the cultural intent of the original word and statement. Despite these measures translation in qualitative studies is an interpretative action and some nuances may be lost during the interview. The transcriber was also isiZulu and English speaking and this supported accurate transcription of the interviews. After transcription the researcher and the transcriber reviewed all the segments that carried a linguistic or cultural nuance to confirm that the transcriptions reflected the participant's intentions as closely as possible.

A potential limitation of this study was also are linked to its design. Given that a qualitative approach was used, with much smaller sample sizes, the potential for generalizability may be affected. This was offset by the fact that the study was a case study of the eThekwin area, offering rich insights into this selected geographical area. The inclusion of three different areas in eThekwin, namely a semi-rural, urban and informal settlement area, contributed significantly to a deeper understanding of how these areas were affected. Moreover, the study did not seek quantifiable data, but rather to understand the experiences of these individuals within the context of the floods.

The emotional sensitivity of the topic, especially for individuals who experienced the trauma and displacement linked to the floods, may have constrained the openness of their responses. Moreover, the use of smaller samples may not have covered those whose experiences may have differed. Nonetheless the use of purposive sampling

ensured that those most affected, were recruited so that the entire realm of experiences, within three diverse settings was covered.

5.8 Conclusion

The April 2022 floods was the worst flooding event that the eThekweni district had seen and had a significant impact on individuals, families and communities. This study offered rich and insightful perspectives into the lives of those affected by the floods. It reflected the interconnected nature between the physical, psychological, social and spiritual effects of the flood, by showing how damages to homes, livelihoods and the displacement were intertwined with mental health struggles and social isolation. Faith based organizations filled a critical gap in service provision and contributed meaningfully to the disaster response and recovery.

The effects of flooding on individuals and communities are an emergent public health concern. The findings in this study emphasize the need to move towards disaster preparation and mitigation. This study will contribute to the disaster management policies and strategies in eThekweni and South Africa, through its holistic findings, on how individuals, families and communities were affected and the role played by local government and community organizations in responding to the disaster.

This chapter closes with the following quote that allows us to contemplate that while hazards themselves may be natural, their transformation into a disaster is not inevitable. It allows us to consider a broader range of interventions that can reduce exposure and vulnerability especially as global climate change intensifies and urbanization increases the eThekweni district.

“Hazards turn into disasters because our human decisions don’t take us to reduce vulnerability exposure. Disasters are, in a way or another, all human made” (Mizutori 2022).

REFERENCES

Abass, K., Gyasi, R. M., Katey, D., Frempong, F. and Garsonu, E. K. 2022. Flood exposure and psychological distress among Ghanaian adults in flood-prone settings. *Science of the Total Environment*, 835: 155481. Available: <https://www.sciencedirect.com/science/article/pii/S0048969722025773> (Accessed 3 January 2023).

Abdullah, K. H. and Sofyan, D. 2023. Building resilient societies through a holistic approach to disaster management: A perspective article. *Journal of Metrics Studies and Social Science*, 2 (1): 17–32. Available: <https://ejournal.papanda.org/index.php/jmsss/article/view/499> (Accessed 2 May 2025).

Abegaz, R., Xu, J., Wang, F. and Huang, J. 2024. Impact of flooding events on buried infrastructures: a review. *Frontiers in Built Environment*, 10: 1357741. Available: <https://www.frontiersin.org/articles/10.3389/fbuil.2024.1357741/full> (Accessed 14 February 2025).

Acosta-España, J. D., Romero-Alvarez, D., Luna, C. and Rodriguez-Morales, A. J. 2024. Infectious disease outbreaks in the wake of natural flood disasters: Global patterns and local implications. *Le Infezioni in Medicina*, 32 (4): 451. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11627491/> (Accessed 23 January 2025).

Adams, E. A. and Nyantakyi-Frimpong, H. 2021. Stressed, anxious, and sick from the floods: A photovoice study of climate extremes, differentiated vulnerabilities, and health in Old Fadama, Accra, Ghana. *Health & Place*, 67: 102500. Available: <https://www.sciencedirect.com/science/article/pii/S1353829220318943> (Accessed 12 June 2025).

Adamtey, R., Mensah, J. V. and Kovor, F. 2020. The Role of faith-based organisations in filling the resource gaps of local governments in Ghana: The case of Keta municipal assembly. *International Journal of Asian Social Science*, 10 (9): 548–559. Available:

https://www.researchgate.net/publication/344432042_The_Role_of_Faith-Based_Organisations_in_Filling_the_Resource_Gaps_of_Local_Governments_in_Ghana_The_Case_of_Keta_Municipal_Assembly (Accessed 12 June 2022).

Adedibu, B. A. 2023. Nigerian Pentecostal megachurches and development: A Diaconal analysis of the redeemed Christian Church of God. *Religions*, 14 (1): 70. Available: <https://www.mdpi.com/2077-1444/14/1/70> (Accessed 19 February 2024).

Adger, W.N., de Campos, R.S., Siddiqui, T., Gavonel, M.F., Szaboova, L., Rocky, M.H., Bhuiyan, M.R.A. and Billah, T. 2021. Human security of urban migrant populations affected by length of residence and environmental hazards. *Journal of Peace Research*, 58(1): 50-66. Available: <https://journals.sagepub.com/doi/abs/10.1177/0022343320973717> (Accessed 19 June 2022).

Adler, A. B. and Gutierrez, I. A. 2022. Acute stress reaction in combat: Emerging evidence and peer-based interventions. *Current Psychiatry Reports*, 24 (4): 277–284. Available: <https://link.springer.com/article/10.1007/s11920-022-01335-2> (Accessed 3 March 2023).

Adom, D., Hussein, E. K. and Agyem, J. A. 2018. Theoretical and conceptual framework: Mandatory ingredients of a quality research. *International Journal of Scientific Research*, 7(1): 438-441. Available: https://www.researchgate.net/publication/322204158_ (Accessed 3 April 2024).

Africa Centre for Strategic Studies. 2022. *Cyclones and more frequent storms threaten Africa*. Available: <https://africacenter.org/wp-content/uploads/2023/02/Cyclones-Storms-Threaten-Africa.pdf> (Accessed 9 December 2022).

Agabiirwe, C. N., Dambach, P., Methula, T. C. and Phalkey, R. K. 2022. Impact of floods on undernutrition among children under five years of age in low-and middle-income countries: A systematic review. *Environmental Health*, 21 (1): 98. Available:

<https://link.springer.com/article/10.1186/s12940-022-00910-7> (Accessed 30 March 2024).

Agonafir, C., Lakhankar, T., Khanbilvardi, R., Krakauer, N., Radell, D. and Devineni, N. 2023. A review of recent advances in urban flood research. *Water Security*, 19: 100141. Available: <https://www.sciencedirect.com/science/article/pii/S2468312423000093> (Accessed 4 April 2024).

Ahern, M., Kovats, R. S., Wilkinson, P., Few, R. and Matthies, F. 2005. Global health impacts of floods: Epidemiologic evidence. *Epidemiologic reviews*, 27 (1): 36–46. Available: <https://academic.oup.com/epirev/article-abstract/27/1/36/520815> (Accessed 12 May 2022).

Ahmad, D. and Afzal, M. 2021. Flood hazards, human displacement and food insecurity in rural riverine areas of Punjab, Pakistan: policy implications. *Environmental Science and Pollution Research*, 28 (8): 10125–10139. Available: <https://link.springer.com/article/10.1007/s11356-020-11430-7> (Accessed 9 May 2023).

Ahmadi, C., Karampourian, A. and Samarghandi, M. R. 2022. Explain the challenges of evacuation in floods based on the views of citizens and executive managers. *Heliyon*, 8 (9). Available: <https://www.sciencedirect.com/science/article/pii/S2405844022020473> (Accessed: 17 February 2023).

Ahmed, S. K. 2024. The pillars of trustworthiness in qualitative research. *Journal of Medicine, Surgery, and Public Health*, 2: 100051. Available: <https://doi.org/10.1016/j.glmedi.2024.100051> (Accessed 21 November 2024).

Ajibade, I., Armah, F. A., Kuuire, V. Z., Luginaah, I., McBean, G. and Tenkorang, E. Y. 2014. Assessing the bio-psychosocial correlates of flood impacts in coastal areas of Lagos, Nigeria. *Journal of Environmental Planning and Management*, 58 (3): 445–

463. Available:

<https://www.tandfonline.com/doi/abs/10.1080/09640568.2013.861811> (Accessed 23 February 2024).

Ajodhia, S. and Makhanya, T. B. 2024. The lived experiences of displaced African single mothers in the aftermath of floods in Kwazulu-Natal. *Social Work/Maatskaplike Werk*, 60 (3): 602–621. Available: https://www.scielo.org.za/scielo.php?pid=S0037-80542024000300008&script=sci_arttext (Accessed 12 December 2024).

Akaishi, T., Morino, K., Maruyama, Y., Ishibashi, S., Takayama, S., Abe, M., Kanno, T., Tadano, Y. and Ishii, T. 2021. Restoration of clean water supply and toilet hygiene reduces infectious diseases in post-disaster evacuation shelters: A multicenter observational study. *Heliyon*, 7 (5). Available: [https://www.cell.com/heliyon/fulltext/S2405-8440\(21\)01147-6](https://www.cell.com/heliyon/fulltext/S2405-8440(21)01147-6) (Accessed 12 May 2025).

Akbar, M. S., Ahmad, S., Safdar, M. R. and Yousaf, F. N. 2024. A failure or success? A qualitative analysis of post-disaster relocation among survivors of 2010 floods in Pakistan. *International Journal of Disaster Risk Reduction*, 100: 104138. Available: <https://www.sciencedirect.com/science/article/pii/S2212420923006180> (Accessed 2 January 2025).

Akram, S. and Mushtaq, S. 2024. Environmental change and floods: The long-ignored effects of displacement on mental health. *Frontiers in Public Health*, 12: 1434123. Available: <https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1434123/full> (Accessed 14 January 2025).

Aksha, S. K., Juran, L., Resler, L. M. and Zhang, Y. 2018. An analysis of social vulnerability to natural hazards in Nepal using a modified social vulnerability index. *International Journal of Disaster Risk Science*, 10: 103–116. Available: <https://link.springer.com/article/10.1007/s13753-018-0192-7> (Accessed 29 July 2024).

Akukwe, T. I., Oluoko-Odingo, A. A. and Khoda, G. O. 2020. Do floods affect food security? A before-and-after comparative study of flood-affected households' food security status in South-Eastern Nigeria. *Bulletin of Geography. Socio-Economic Series*, (47): 115–131. Available: <https://apcz.umk.pl/BGSS/article/view/20391> (Accessed 4 April 2022).

Alam, M. S., Sultana, R. and Haque, M. A. 2022. Vulnerabilities of older adults and mitigation measures to address COVID-19 outbreak in Bangladesh: A review. *Social Sciences & Humanities Open*, 6 (1): 100336. Available: <https://www.sciencedirect.com/science/article/pii/S2590291122000900> (Accessed 5 February 2023).

Al-Betawi, Y. N., Ali, H. H. and Yousef, S. I. 2020. A methodology for evaluating housing quality in settlements of the displaced in Jordan. *Journal of Urban Affairs*, 44 (8): 1076–1100. Available: <https://www.tandfonline.com/doi/abs/10.1080/07352166.2020.1782226> (Accessed 4 March 2023).

Aldrich, D. P. and Sawada, Y. 2015. The physical and social determinants of mortality in the 3.11 tsunami. *Social Science & Medicine*, 124: 66–75. Available: <https://www.sciencedirect.com/science/article/pii/S0277953614007485> (Accessed 10 June 2022).

Alem, D. D. 2020. An overview of data analysis and interpretations in research. *International Journal of Academic Research in Education and Review*, 8 (1): 1–27. Available: <https://www.academia.edu/download/78408562/Dawit.pdf> (Accessed 3 June 2023).

Alesch, D. J., Arendt, L. A. and Holly, J. N. 2010. Extreme events and community recovery. In: *Proceedings of the 9th U.S. National and 10th Canadian Conference on Earthquake Engineering*. Toronto, Ontario, 25-29 July 2010. Available: <https://www.caee.ca/10CCEEpdf/2010EQConf-001729.pdf> (Accessed 25 May 2022).

Alexander, D. 2018a. *Natural disasters*. London: Routledge. Available: <https://www.taylorfrancis.com/books/mono/10.4324/9781315859149/natural-disasters-david-alexander> (Accessed 19 July 2022).

Alexander, K. A., Heaney, A. K. and Shaman, J. 2018b. Hydrometeorology and flood pulse dynamics drive diarrheal disease outbreaks and increase vulnerability to climate change in surface-water-dependent populations: A retrospective analysis. *PLoS medicine*, 15 (11): e1002688. Available: <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002688> (Accessed 19 May 2022).

Alfaiate, P. C. 2009. Mozambique and natural disasters: human capital under threat. Available: <https://mpira.ub.uni-muenchen.de/id/eprint/18189> (Accessed 8 July 2022).

Alharahsheh, H. H. and Pius, A. 2020. A review of key paradigms: Positivism vs interpretivism. *Global Academic Journal of Humanities and Social Sciences*, 2 (3): 39–43. Available: https://gajrc.com/media/articles/GAJHSS_23_39-43_VMGJbOK.pdf (Accessed 9 September 2022).

Aliyu, A., Liman-Hamza, K. and Lawal, A. 2023. Floods in Sub-Saharan Africa; causes, determinants and health consequences. *Nigerian Medical Journal*, 64 (1): 13–24. Available: <https://www.ajol.info/index.php/nmj/article/view/252063> (Accessed 12 March 2024).

Alston, M., Hargreaves, D. and Hazeleger, T. 2018. Postdisaster social work: Reflections on the nature of place and loss. *Australian Social Work*, 71 (4): 405–416. Available: <https://www.tandfonline.com/doi/abs/10.1080/0312407X.2017.1409776> (Accessed 31 May 2022).

American Psychiatric Association. 2023. *Coping after disaster*. Available: <https://www.psychiatry.org/patients-families/coping-after-disaster-trauma#:~:text=Common%20reactions%20in%20adults%20after,to%20avoid%20speculation%20and%20rumors> (Accessed 12 December 2023).

Ameruddin, N. F. L., Berezina, E. and Yap, C. C. 2025. Exploring predictors of psychological preparedness for flood victims: A conceptual framework for Malaysia. *F1000Research*, 14: 195. Available: <https://f1000research.com/articles/14-195> (Accessed 20 June 2025).

Amiri, H. and Jahanitabesh, A. 2022. Psychological reactions after disasters. In: *Natural hazards-new insights*. London: IntechOpen. Available: <https://www.intechopen.com/chapters/85253> (Accessed 14 March 2023).

Ampofo, J., Iddrisu, A., Arfasa, G., Mantey, I. and Aniah, E. 2024. Causes of Informal Settlement in Africa: A systematic review. *Adrri Journal of Contemporary African Development*, 1: 1–18. Available: https://www.researchgate.net/publication/379445620_Causes_of_Informal_Settlement_in_Africa_A_systematic_review (Accessed 16 November 2024).

Anwana, E. O. and Owojori, O. M. 2023. Analysis of flooding vulnerability in informal settlements literature: Mapping and research agenda. *Social Sciences*, 12 (1): 40. Available: <https://www.mdpi.com/2076-0760/12/1/40> (Accessed 5 April 2023).

Apisarnthanarak, A., Khawcharoenporn, T., Woeltje, K. F. and Warren, D. K. 2012. Hospital flood preparedness: A survey of 15 provinces in central Thailand. *Infection Control & Hospital Epidemiology*, 33 (9): 952–954. Available: <https://pubmed.ncbi.nlm.nih.gov/22869272/> (Accessed 18 July 2022).

Arellano, L., Alcubilla, P. and Leguízamo, L. 2023. Ethical considerations in informed consent. In: *Ethics-scientific research, ethical issues, artificial intelligence and education*. London: IntechOpen. Available: https://www.researchgate.net/publication/372300197_Ethical_considerations_in_informed_consent (Accessed 21 June 2023).

Aronson, E. 2008. Fear, denial, and sensible action in the face of disasters. *Social Research: An International Quarterly*, 75 (3): 855–872. Available:

<https://muse.jhu.edu/pub/1/article/527616/summary> (Accessed 8 August 2022).

Asenahabi, B. M., Busula, A. O. and Ronoh, R. 2019. A choice dilemma in selecting an appropriate research design. *International Journal of Advanced Research in Computer Engineering & Technology*, 8(8). Available: http://41.89.205.12/bitstream/handle/123456789/1314/A_CHOICE_DILEMMA_IN_SELECTING_AN_APPROPRIATE_RESEARCH_DESIGN.pdf?sequence=1 (Accessed 2 March 2022).

Asiedu, J. B. 2020. Reviewing the argument on floods in urban areas: A look at the causes. *Theoretical and Empirical Researches in Urban Management*, 15 (1): 24–41. Available: <https://www.cceol.com/search/article-detail?id=888384> (Accessed 20 May 2022).

Asim, M., Sathian, B., Van Teijlingen, E., Mekkodathil, A. A., Babu, M. R., Rajesh, E., Kumar, R., Simkhada, P. and Banerjee, I. 2022. A survey of post-traumatic stress disorder, anxiety and depression among flood affected populations in Kerala, India. *Nepal Journal of Epidemiology*, 12 (2): 1203. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC9374108/> (Accessed 4 July 2023).

Assanangkornchai, S., Tangboonngam, S. N., Sam-Angsri, N. and Edwards, J. G. 2007. A Thai community's anniversary reaction to a major catastrophe. *Stress and Health: Journal of the International Society for the Investigation of Stress*, 23 (1): 43–50. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/smi.1118> (Accessed 12 May 2022).

Atanga, R. A. 2020. The role of local community leaders in flood disaster risk management strategy making in Accra. *International Journal of Disaster Risk Reduction*, 43: 101358. Available: <https://doi.org/10.1016/j.ijdrr.2019.101358> (Accessed 3 June 2022).

Atanga, R. A. and Tankpa, V. 2021. Climate change, flood disaster risk and food security nexus in Northern Ghana. *Frontiers in Sustainable Food Systems*, 5: 706721. Available:

<https://www.frontiersin.org/articles/10.3389/fsufs.2021.706721/full> (Accessed 3 April 2022).

Atkinson, C. L. 2014. The 2011 flood in Minot (North Dakota, USA) and the role of faith-based and nonprofit groups in hazard event response and recovery. *International Journal of Disaster Risk Reduction*, 8: 166–176. Available: <https://www.sciencedirect.com/science/article/pii/S2212420914000247> (Accessed 15 May 2022).

Atwoli, L., Platt, J., Williams, D. R., Stein, D. J. and Koenen, K. C. 2015. Association between witnessing traumatic events and psychopathology in the South African stress and health study. *Social Psychiatry and Psychiatric Epidemiology*, 50: 1235–1242. Available: <https://link.springer.com/article/10.1007/s00127-015-1046-x> (Accessed 8 June 2022).

Auditor General South Africa. 2022. *Auditor general report response to KwaZulu Natal and Eastern Cape flood disaster as too slow*. Available: <https://www.agsa.co.za/Portals/0/Reports/Special%20Reports/RealTime/Media%20Statement%20-%20First%20special%20report%20on%202022%20real-time%20audit%20on%20flood%20relief%20funds%20-%2031%20August%202022%20FINAL.pdf?ver=2022-08-31-103740-440> (Accessed 26 November 2023).

Ayejoto, D. A., Agbasi, J. C., Nwazelibe, V. E., Egbueri, J. C. and Alao, J. O. 2023. Understanding the connections between climate change, air pollution, and human health in Africa: Insights from a literature review. *Journal of Environmental Science and Health, Part C*, 41 (3-4): 77–120. Available: <https://www.tandfonline.com/doi/abs/10.1080/26896583.2023.2267332> (Accessed 12 March 2024).

Azeem, S., Cheema, H. A., Shahid, A., Al-Mamun, F., Rackimuthu, S., Rehman, M. E. U., Essar, M. Y. and Lee, K. Y. 2023. Devastating floods in South Asia: The inequitable repercussions of climate change and an urgent appeal for action. *Public*

Health in Practice, 5: 100365. Available:
<https://pmc.ncbi.nlm.nih.gov/articles/PMC9958364/> (Accessed 16 February 2024).

Aziz, F., Wang, X. and Mahmood, M.Q., 2025. Assessing human health risks associated with wastewater flooding. *Environmental Impact Assessment Review*, 115: 108031. Available:
<https://www.sciencedirect.com/science/article/pii/S0195925525002288> (Accessed: 22 May 2025).

Aziz, A. and Khan, N. 2021. The potential uses of pilot study in qualitative research. *Journal of Research & Reviews in Social Sciences Pakistan*, 3: 750–767. Available:
https://www.researchgate.net/publication/357203566_THE_POTENTIAL_USES_OF_PILOT_STUDY_IN_QUALITATIVE_RESEARCH (Accessed 30 June 2022).

Babaie, J., Naghipour, B. and Faridaalae, G. 2021. Cardiovascular diseases in natural disasters; a systematic review. *Archives of academic emergency medicine*, 9 (1): e36. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8126350/> (Accessed 12 September 2022).

Badampudi, D., Fotrousi, F., Cartaxo, B. and Usman, M. 2022. Reporting consent, anonymity and confidentiality procedures adopted in empirical studies using human participants. *e-Informatica Software Engineering Journal*, 16: 220109. Available:
https://www.researchgate.net/publication/362996305_Reporting_Consent_Anonymity_and_Confidentiality_Procedures_Adopted_in_Empirical_Studies_Using_Human_Participants (Accessed 9 July 2023).

Baddianaah, I. 2023. We all share the blame: Analyzing the root causes of flooding in African cities with specific reference to Harper City, Liberia. *Environmental Challenges*, 13: 100790. Available:
<https://www.sciencedirect.com/science/article/pii/S2667010023001130> (Accessed 12 February 2024).

Baidhaw, Z. 2015. The role of faith-based organization in coping with disaster

management and mitigation: Muhammadiyah's experience. *Journal of Indonesian Islam*, 9 (2): 167–194. Available: <http://jiis.uinsby.ac.id/index.php/JIIs/article/view/230> (Accessed 12 May 2022).

Baker, L. R. and Cormier, L. A. 2015. *Disasters and vulnerable populations: Evidence-based practice for the helping professions*. New York: Springer Publishing Company. Available: https://books.google.com/books?hl=en&lr=&id=SkdRBAAQBAJ&oi=fnd&pg=PP1&ots=Nlw2L9D2X6&sig=51EFS77n811yKnYa_0Qlgnfz0wE (Accessed 12 June 2022).

Bakic, H. and Ajdukovic, D. 2021. Resilience after natural disasters: The process of harnessing resources in communities differentially exposed to a flood. *European Journal of Psychotraumatology*, 12 (1): 1891733. Available: <https://www.tandfonline.com/doi/abs/10.1080/20008198.2021.1891733> (Accessed 20 May 2022).

Balaian, S. K., Sanders, B. F. and Abdolhosseini Qomi, M. J. 2024. How urban form impacts flooding. *Nature Communications*, 15 (1): 6911. Available: <https://www.nature.com/articles/s41467-024-50347-4> (Accessed 3 February 2025).

Baraldo, M. and di Franco, P. D. 2024. Place-centred emerging technologies for disaster management: A scoping review. *International Journal of Disaster Risk Reduction*, 112: 104782. Available: <https://www.sciencedirect.com/science/article/pii/S2212420924005442> (Accessed 12 December 2024).

Baran-Zgłobicka, B., Godziszewska, D. and Zgłobicki, W. 2021. The flash floods risk in the local spatial planning (case study: Lublin Upland, E Poland). *Resources*, 10 (2): 14. Available: <https://www.mdpi.com/2079-9276/10/2/14> (Accessed 12 July 2022).

Barna Group. 2021. *38% of U.S. Pastors have thought about quitting full-time ministry in the past year*. Available: <https://www.barna.com/research/pastors-well->

being/ (Accessed 29 June 2022).

Barnes, M. A., Turner, K., Ndarana, T. and Landman, W. A. 2021. Cape storm: A dynamical study of a cut-off low and its impact on South Africa. *Atmospheric Research*, 249: 105290. Available: <https://www.sciencedirect.com/science/article/pii/S0169809520312278> (Accessed 20 May 2022).

Barnwell, G. 2021. *The psychological and mental health consequences of climate change in South Africa*. Cape Town: Centre for Environmental Rights. Available: <https://cer.org.za/wp-content/uploads/2021/09/CER-Expert-Report-Garret-Barnwell-31-August-2021-Public-1.pdf> (Accessed 3 May 2022).

Bartholdson, S. and von Schreeb, J. 2018. Natural disasters and injuries: What does a surgeon need to know? *Current Trauma Reports*, 4: 103–108. Available: <https://link.springer.com/article/10.1007/s40719-018-0125-3> (Accessed 8 June 2022).

Bashawri, A. M. A. 2019. An emergency relief shelter response framework for flash floods in Saudi Arabia. PhD., University of Leeds. Available: <https://etheses.whiterose.ac.uk/id/eprint/23962/> (Accessed 26 June 2022).

Basile, A. L. 2020. Disaster relief shelter experience during Hurricane Sandy: A preliminary phenomenological inquiry. *International Journal of Disaster Risk Reduction*, 45: 101466. Available: <https://www.sciencedirect.com/science/article/pii/S2212420919303413> (Accessed 15 June 2022).

Basistha, B., Paul, F. A., Ali, A. and Saikia, S. J. 2024. Environmental quality of life and psychological distress of emerging adults in flood-affected areas of Assam, India: A Cross-Sectional Study. *Journal of Psychiatry Spectrum*, 3 (1): 41–46. Available: https://journals.lww.com/jops/_layouts/15/oaks.journals/downloadpdf.aspx?an=02272

812-202303010-00007 (Accessed 7 June 2025).

Bathina, K., Ten Thij, M. and Bollen, J. 2022. Quantifying societal emotional resilience to natural disasters from geo-located social media content. *PLoS one*, 17 (6): e0269315. Available:
<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269315> (Accessed 3 March 2023).

Berger, E., Carroll, M., Maybery, D. and Harrison, D. 2018. Disaster impacts on students and staff from a specialist, trauma-informed Australian school. *Journal of Child & Adolescent Trauma*, 11: 521–530. Available:
<https://link.springer.com/article/10.1007/s40653-018-0228-6> (Accessed 20 June 2022).

Berger, J. and Kent, C. 2016. Religious Organizations. In: Farazmand, A. eds. *Global Encyclopedia of Public Administration, Public Policy, and Governance*. Cham: Springer, 1-14. Available:
https://www.academia.edu/download/48972629/Berger_Religious_Organizations.pdf. (Accessed 8 July 2022).

Bergin, T. 2018. *An Introduction to Data Analysis: Quantitative, Qualitative and Mixed Methods*. London: SAGE Publications Ltd. Available:
<https://methods.sagepub.com/book/mono/an-introduction-to-data-analysis/toc> (Accessed 21 August 2022).

Bergstrand, K. and Mayer, B. 2020. “The community helped Me:” Community cohesion and environmental concerns in personal assessments of post-disaster recovery. *Society & Natural Resources*, 33 (3): 386–405. Available:
<https://www.tandfonline.com/doi/abs/10.1080/08941920.2019.1709002> (Accessed 8 July 2022).

Berrebi, C., Karlinsky, A. and Yonah, H. 2021. Individual and community behavioral responses to natural disasters. *Natural Hazards*, 105 (2): 1541–1569. Available:

<https://link.springer.com/article/10.1007/s11069-020-04365-2> (Accessed 19 May 2023).

Bhardwaj, P. 2019. Types of sampling in research. *Journal of the Practice of Cardiovascular Sciences*, 5 (3): 157–163. Available: https://journals.lww.com/jpcs/fulltext/2019/05030/types_of_sampling_in_research.6.aspx (Accessed 2 June 2022).

Bhatia, M. K. 2016. Data analysis and its importance. *International Research Journal of Advanced Engineering and Science*, 2 (1): 166–168. Available: <https://www.academia.edu/download/113671854/IRJAES-V2N1P58Y17.pdf> (Accessed 12 May 2023).

Bhengu, O. 2013. An evaluation of the extent of community participation in the upgrading of informal settlements: The case study of Joe Slovo settlement upgrading project in Lamontville. Available: <https://researchspace.ukzn.ac.za/bitstreams/d0e5b6fd-95c3-45c9-ab97-35a7db78e27c/download> (Accessed 12 July 2022).

Bhutto, S., Vighio, K. and Bhutto, N. 2025. Climate change and gender-based violence: A study of flood-affected women in rural Sindh, Pakistan. *Zakariya Journal of Social Science*, 4 (1): 56–69. Available: <https://journals.airsd.org/index.php/zjehss/article/view/523> (Accessed 2 June 2025).

Bich, T. H., Quang, L. N., Thanh Ha, L. T., Duc Hanh, T. T. and Guha-Sapir, D. 2011. Impacts of flood on health: Epidemiologic evidence from Hanoi, Vietnam. *Global health action*, 4 (1): 6356. Available: <https://www.tandfonline.com/doi/abs/10.3402/gha.v4i0.6356> (Accessed 13 October 2023).

Biswas, S. and Nautiyal, S. 2023. A review of socio-economic vulnerability: The emergence of its theoretical concepts, models and methodologies. *Natural Hazards Research*, 3 (3): 563–571. Available:

<https://www.sciencedirect.com/science/article/pii/S2666592123000525> (Accessed 25 March 2025).

Blackman, D., Prayag, G., Nakanishi, H., Chaffer, J. and Freyens, B. 2023. Wellbeing in disaster recovery: Understanding where systems get stuck. *International Journal of Disaster Risk Reduction*, 95: 103839. Available: <https://www.sciencedirect.com/science/article/pii/S2212420923003199> (Accessed 2 May 2025).

Blake, D., Marlowe, J. and Johnston, D. 2017. Get prepared: discourse for the privileged? *International Journal of Disaster Risk Reduction*, 25: 283–288. Available: <https://www.sciencedirect.com/science/article/pii/S221242091730242X> (Accessed 18 July 2022).

Blake, D., Rijnink, A., Lyons, A. and Aspin, C. 2024. Losing everything: Experiences of a flood for people who inject drugs in Aotearoa New Zealand. *International Journal of Disaster Risk Reduction*, 106: 104440. Available: <https://www.sciencedirect.com/science/article/pii/S2212420924002024> (Accessed 12 June 2025).

Blanc, J., Eugene, D., Louis, E. F., Cadichon, J. M., Joseph, J., Pierre, A., Laine, R., Alexandre, M. and Huang, K.Y. 2020. Mental health among children older than 10 years exposed to the Haiti 2010 earthquake: A critical review. *Current Psychiatry Reports*, 22: 1–13. Available: <https://link.springer.com/article/10.1007/s11920-020-01178-9> (Accessed 15 May 2022).

Blanck, P., Perleth, S., Heidenreich, T., Kröger, P., Ditzen, B., Bents, H. and Mander, J. 2018. Effects of mindfulness exercises as stand-alone intervention on symptoms of anxiety and depression: Systematic review and meta-analysis. *Behaviour Research and Therapy*, 102: 25–35. Available: <https://www.sciencedirect.com/science/article/pii/S0005796717302449> (Accessed 9 September 2022).

Bolton, D. 2023. A revitalized biopsychosocial model: core theory, research paradigms, and clinical implications. *Psychological Medicine*, 53(16): 7504-7511. Available: <https://www.cambridge.org/core/journals/psychological-medicine/article/revitalized-biopsychosocial-model-core-theory-research-paradigms-and-clinical-implications/8FC915C01228857ED6B5E123536E8994> (Accessed: 25 November 2023).

Bongo, P. P., Lunga, W., Van Niekerk, D. and Musarurwa, C. 2019. Disability and disaster risk reduction as an incongruent matrix: Lessons from rural Zimbabwe. *Jàmbá: Journal of Disaster Risk Studies*, 11 (1): 1–7. Available: <https://journals.co.za/doi/abs/10.4102/jamba.v11i1.648> (Accessed 19 November 2022).

Bornmann, L. and Marx, W. 2020. Thomas theorem in research evaluation. *Scientometrics*, 123 (1): 553–555. Available: <https://link.springer.com/article/10.1007/S11192-020-03389-6> (Accessed 19 September 2023).

Boro, E., Sapra, T., de Lavison, J.-F., Dalabona, C., Ariyaratne, V. and Samsudin, A. 2022. The role and impact of faith-based organisations in the management of and response to COVID-19 in low-resource settings: policy & practice note. *Religion and Development*, 1 (1): 132–145. Available: https://brill.com/view/journals/rnd/1/1/article-p132_8.xml (Accessed 22 September 2023).

Bos, J. 2020. *Research ethics for students in the Social Sciences*. Cham: Springer Nature. Available: <https://library.oapen.org/handle/20.500.12657/42569> (Accessed 7 June 2022).

Boss, P., Bryant, C. M. and Mancini, J. A. 2016. *Family stress management: A contextual approach*. London: Sage Publications. Available: <https://books.google.com/books?hl=en&lr=&id=7U-0DAAAQBAJ&oi=fnd&pg=PP1&ots=EKfLKS mvnp&sig=otfLkPPnsJHtgBh5UPgUcLqI>

ZWU (Accessed 20 June 2022).

Bouchard, J.P., Pretorius, T. B., Kramers-Olen, A. L., Padmanabhanunni, A. and Stiegler, N. 2023. Global warming and psychotraumatology of natural disasters: The case of the deadly rains and floods of April 2022 in South Africa. In: *Proceedings of Annales Médico-psychologiques, Revue Psychiatrique*. Elsevier, 234–239. Available: <https://www.sciencedirect.com/science/article/pii/S0003448722002062> (Accessed 25 November 2024).

Bovey, M., Hosny, N., Dutray, F. and Heim, E. 2024. PTSD and complex PTSD manifestations in Sub-Saharan Africa: A systematic review of qualitative literature. *SSM-Mental Health*, 5: 100298. Available: <https://www.sciencedirect.com/science/article/pii/S2666560324000033> (Accessed 2 October 2024).

Bożek, A., Nowak, P. F. and Blukacz, M. 2020. The relationship between spirituality, health-related behavior, and psychological well-being. *Frontiers in Psychology*, 11: 1997. Available: <https://www.frontiersin.org/articles/10.3389/fpsyg.2020.01997/full> (Accessed 2 April 2024).

Braimah, M. M., Abdul-Rahaman, I., Oppong-Sekyere, D., Momori, P. H., Abdul-Mohammed, A. and Dordah, G. A. 2014. A study into the causes of floods and its socio-economic effects on the people of Sawaba in the Bolgatanga Municipality, Upper East, Ghana. *International Journal of Pure & Applied Bioscience*, 2(1): 189-195. Available: <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=be33a8861ff1cb51bacb7b17dbdb3100c849f244> (Accessed 18 April 2022).

Braun, V. and Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3 (2): 77–101. Available: <https://www.tandfonline.com/doi/abs/10.1191/1478088706QP063OA> (Accessed 29 April 2022).

Braun, V. and Clarke, V. 2021. One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, 18 (3): 328–352. Available: <https://www.tandfonline.com/doi/abs/10.1080/14780887.2020.1769238> (Accessed 12 March 2022).

Breen, K., Meyer, M. A., Becker, S., Purdum, J. C. and Nolan, S. 2024. Volunteer motivations in civilian volunteer search and rescue organizations. *International Journal of Disaster Risk Reduction*, 111: 104688. Available: <https://www.sciencedirect.com/science/article/pii/S2212420924004503> (Accessed 7 November 2024).

Brown, G. and Susskind, D. 2020. International cooperation during the COVID-19 pandemic. *Oxford Review of Economic Policy*, 36 (Supplement_1): S64–S76. Available: <https://academic.oup.com/oxrep/article-pdf/doi/10.1093/oxrep/graa025/33798322/graa025.pdf> (Accessed 19 August 2022).

Brown University. 2024. *An overview of Crossmoor*. Available: <https://s4.ad.brown.edu/Projects/southafrica/Reports/Durban/Crossmor.pdf> (Accessed 12 December 2024).

Brunsdon, A. R. 2020. A congregation-based pastoral care to the victims of shack fires in the African context. *Verbum et Ecclesia*, 41 (1): 1–9. Available: <https://journals.co.za/doi/abs/10.4102/ve.v41i1.2101> (Accessed 7 June 2022).

Bui, B. K. H., Anglewicz, P. and VanLandingham, M. J. 2021. The impact of early social support on subsequent health recovery after a major disaster: A longitudinal analysis. *SSM-Population Health*, 14: 100779. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8040331/> (Accessed 19 August 2022).

Burnam, L. 2023. *Reflexivity in qualitative research: Why you'll never be an objective observer*. Available: <https://www.userinterviews.com/blog/reflexivity-in-qualitative-research> (Accessed 20 January 2025).

Burrows, K., Desai, M. U., Pelupessy, D. C. and Bell, M. L. 2021. Mental wellbeing

following landslides and residential displacement in Indonesia. *SSM-mental health*, 1: 100016. Available: <https://www.sciencedirect.com/science/article/pii/S2666560321000165> (Accessed 19 July 2022).

Burton, H., Rabito, F., Danielson, L. and Takaro, T. K. 2016. Health effects of flooding in Canada: A 2015 review and description of gaps in research. *Canadian Water Resources Journal/Revue canadienne des ressources hydriques*, 41 (1-2): 238–249. Available: <https://www.tandfonline.com/doi/abs/10.1080/07011784.2015.1128854> (Accessed 10 October 2023).

Busetto, L., Wick, W. and Gumbinger, C. 2020. How to use and assess qualitative research methods. *Neurological Research and Practice*, 2 (1): 14. Available: <https://link.springer.com/article/10.1186/s42466-020-00059-z> (Accessed 22 May 2022).

Bushong, L. C. and Welch, P. 2023. Critical healthcare for older adults post Hurricane Ian in Florida, United States. *Journal of Public Health Policy*, 44 (4): 674–684. Available: <https://link.springer.com/article/10.1057/s41271-023-00444-3> (Accessed 14 March 2024).

Byrne, D. 2021. A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & Quantity*, 56 (3): 1391–1412. Available: <https://link.springer.com/article/10.1007/s11135-021-01182-y> (Accessed 7 May 2023).

Calhoun, C. D., Stone, K. J., Cobb, A. R., Patterson, M. W., Danielson, C. K. and Bendezú, J. J. 2022. The role of social support in coping with psychological trauma: An integrated biopsychosocial model for posttraumatic stress recovery. *Psychiatric Quarterly*, 93 (4): 949–970. Available: <https://link.springer.com/article/10.1007/s11126-022-10003-w> (Accessed 14 April 2023).

Callender, K. A., Ong, L. Z. and Othman, E. H. 2022. Prayers and mindfulness in relation to mental health among first-generation immigrant and refugee Muslim women in the USA: An exploratory study. *Journal of Religion and Health*, 61 (5): 3637–3654. Available: <https://link.springer.com/article/10.1007/s10943-022-01600-x> (Accessed 14 August 2022).

Calvo-Solano, O. and Quesada-Román, A. 2024. Worldwide research trends and networks on flood early warning systems. *GeoHazards*, 5 (3): 582–595. Available: <https://www.mdpi.com/2624-795X/5/3/30> (Accessed 3 March 2025).

Campbell, L., Cheng, H., Svendsen, E., Kochnowier, D., Bunting-Howarth, K. and Wapnitsky, P. 2021. Living with water: documenting lived experience and social-emotional impacts of chronic flooding for local adaptation planning. *Cities and the Environment*, 14(1). Available: <https://digitalcommons.lmu.edu/cate/vol14/iss1/4/> (Accessed 29 July 2022).

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D. and Walker, K. 2020. Purposive sampling: complex or simple? Research case examples. *Journal of Research in Nursing*, 25 (8): 652–661. Available: <https://journals.sagepub.com/doi/abs/10.1177/1744987120927206> (Accessed 8 August 2022).

Campbell, S. B. and Renshaw, K. D. 2018. Posttraumatic stress disorder and relationship functioning: A comprehensive review and organizational framework. *Clinical Psychology Review*, 65: 152–162. Available: <https://www.sciencedirect.com/science/article/pii/S0272735817302465> (Accessed 9 July 2022).

Caniglia, F. and Trotman, A. 2011. *A silver lining: community development, crisis and belonging: Exploring the role of community development in Queensland's recovery from the January 2011 floods*. Brisbane: Under 1 Roof. Available: <https://ncq.org.au/resources/a-silver-lining-community-development-crisis-and-belonging/> (Accessed 2 June 2022).

Carbonell, L., Hofmann, P., Srikiisoon, N., Campos, L. C., Mbatha, S., Lakhanpaul, M., Mabeer, V., Steenmans, I. and Parikh, P. 2023. Localisation of links between sanitation and the Sustainable Development Goals to inform municipal policy in eThekweni Municipality, South Africa. *World Development Sustainability*, 2: 100038. Available: <https://www.sciencedirect.com/science/article/pii/S2772655X22000374> (Accessed 12 March 2024).

Carias, M. S., Johnston, D. W., Knott, R. and Sweeney, R. 2022. Flood disasters and health among the urban poor. *Health Economics*, 31 (9): 2072–2089. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/hec.4566> (Accessed 2 February 2023).

Carrere, J., Vásquez-Vera, H., Pérez-Luna, A., Novoa, A. M. and Borrell, C. 2022. Housing insecurity and mental health: The effect of housing tenure and the coexistence of life insecurities. *Journal of Urban Health*, 99 (2): 268–276. Available: <https://link.springer.com/article/10.1007/s11524-022-00619-5> (Accessed 17 November 2024).

Carrion, V. G., Weems, C. F. and Bradley, T. 2010. Natural disasters and the neurodevelopmental response to trauma in childhood: A brief overview and call to action. *Future Neurology*, 5 (5): 667–674. Available: <https://www.tandfonline.com/doi/abs/10.2217/fnl.10.42> (Accessed 17 June 2022).

Casey, J. A., Fukurai, M., Hernández, D., Balsari, S. and Kiang, M. V. 2020. Power outages and community health: A narrative review. *Current Environmental Health Reports*, 7: 371–383. Available: <https://link.springer.com/article/10.1007/s40572-020-00295-0> (Accessed 19 August 2022).

Casteel, A. and Bridier, N. L. 2021. Describing populations and samples in doctoral student research. *International Journal of Doctoral Studies*, 16 (1): 339–362. Available: <https://ijds.org/Volume16/IJDSv16p339-362Casteel7067.pdf> (Accessed 19 July 2022).

Centre for disease control. 2021. *Loneliness and social isolation linked to serious health conditions*. Available: <https://www.cdc.gov/aging/publications/features/lonely-older-adults.html> (Accessed 2 June 2022).

Chakrabarti, S., Naoaj, M. S., Yang, Y., Zhang, S. and Chen, X. 2023. *The impact of natural disasters on economic growth: A comparative analysis between developed and developing countries*. Available: https://www.researchgate.net/publication/369212663_The_Impact_of_Natural_Disasters_on_Economic_Growth_A_Comparative_Analysis_Between_Developed_and_Developing_Countries (Accessed 9 February 2024).

Chandrasena, D. C. N., Yusof, K. B. W., Liyanapathirana, V. C., Mustafa, M. R. U. and Mustaffa, Z. 2017. Blocked drains syndrome: Physical degradation of the storm drainage system in a compact city. *Advanced Science Letters*, 23 (2): 1407–1411. Available: <https://www.ingentaconnect.com/contentone/asp/asl/2017/00000023/00000002/art00166> (Accessed 20 May 2022).

Chang, K. 2010. Community cohesion after a natural disaster: insights from a Carlisle flood. *Disasters*, 34 (2): 289–302. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-7717.2009.01129.x> (Accessed 12 May 2022).

Chapagain, D., Hochrainer-Stigler, S., Velez, S., Keating, A. and Mechler, R. 2025. Realized resilience after community flood events: A global empirical study. *International Journal of Disaster Risk Reduction*, 118: 105246. Available: <https://www.sciencedirect.com/science/article/pii/S2212420925000706> (Accessed 19 May 2025).

Chartoff, S. E., Kropp, A. M. and Roman, P. 2023. *Disaster planning*. Treasure Island (FL): StatPearls Publishing. Available: <https://www.ncbi.nlm.nih.gov/sites/books/NBK470570/> (Accessed 19 December 2023).

Chaudhary, M. T. and Piracha, A. 2021. Natural disasters—origins, impacts, management. *Encyclopedia*, 1 (4): 1101–1131. Available: <https://www.mdpi.com/2673-8392/1/4/84> (Accessed 2 July 2022).

Chen, A., Giese, M. and Chen, D. 2020. Flood impact on Mainland Southeast Asia between 1985 and 2018—The role of tropical cyclones. *Journal of Flood Risk Management*, 13 (2): e12598. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1111/jfr3.12598> (Accessed 2 May 2022).

Chen, Z., Zhang, L., Wang, N., Wang, Q., Cao, Y. and Chen, H. 2024. Optimizing flood disaster management: Unraveling the role of social organizations in China's GBA through social network analysis. *Frontiers in Energy Research*, 12: 1386032. Available: <https://www.frontiersin.org/articles/10.3389/fenrg.2024.1386032/full> (Accessed 12 May 2025).

Cherry, K. E., Sampson, L., Galea, S., Marks, L. D., Nezat, P. F., Baudoin, K. H. and Lyon, B. A. 2017. Optimism and hope after multiple disasters: Relationships to health-related quality of life. *Journal of Loss and Trauma*, 22 (1): 61–76. Available: <https://www.tandfonline.com/doi/abs/10.1080/15325024.2016.1187047> (Accessed 2 June 2022).

Chida, T. G. and Chabata, T. 2016. The role of faith-based organisations in emergency humanitarian aid: the case of celebration church internal in Harare province. *Business & Social Sciences Journal*, 1 (2): 37–47. Available: <https://journals.co.za/doi/abs/10.10520/EJC-933a2245d> (Accessed 7 October 2023).

Chigbu, U. E., Atiku, S. O. and Du Plessis, C. C. 2023. The science of literature reviews: Searching, identifying, selecting, and synthesising. *Publications*, 11 (1): 2. Available: <https://www.mdpi.com/2304-6775/11/1/2> (Accessed 2 February 2024).

Christian, A. K., Dovie, B. D., Akpalu, W. and Codjoe, S. N. A. 2021. Households' socio-demographic characteristics, perceived and underestimated vulnerability to

floods and related risk reduction in Ghana. *Urban Climate*, 35: 100759. Available: <https://www.sciencedirect.com/science/article/pii/S2212095520306738> (Accessed 12 May

Chohan, H., Awad, J., Jung, C. and Sher, B. K. 2024. Enhancing climate resilience against flooding in housing design through synergistic strategies in Pakistan. *Future Cities and Environment*, 10 (1). Available: <https://www.cspub-fce-submission.org/index.php/fce/article/view/226> (Accessed 7 November 2024).

Chompunud, S. and Imkaew, W. 2019. Health effect on and adaptation of the elderly affected by floods. *Health Emergency and Disaster Nursing*, 6 (1): 2–8. Available: https://www.jstage.jst.go.jp/article/hedn/6/1/6_2016-0010/_article/-char/ja/ (Accessed 17 August 2022).

Cinnamon, J. and Noth, T. 2023. Spatiotemporal development of informal settlements in Cape Town, 2000 to 2020: An open data approach. *Habitat International*, 133: 102753. Available: <https://www.sciencedirect.com/science/article/pii/S0197397523000139> (Accessed 2 February 2024).

Cirella, G. T. and Lyalomhe, F. O. 2018. Flooding conceptual review: Sustainability-focalized best practices in Nigeria. *Applied Sciences*, 8 (9): 1558. Available: <https://www.mdpi.com/2076-3417/8/9/1558> (Accessed 22 May 2022).

Clarke, M. and Ware, V.A. 2015. Understanding faith-based organizations: How FBOs are contrasted with NGOs in international development literature. *Progress in Development Studies*, 15 (1): 37–48. Available: <https://journals.sagepub.com/doi/abs/10.1177/1464993414546979> (Accessed 12 June 2022).

Cleland, J. A. 2017. The qualitative orientation in medical education research. *Korean Journal of Medical Education*, 29 (2): 61. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC5465434/> (Accessed 17 August 2022).

Codjoe, S. N. A. and Owusu, G. 2011. Climate change/variability and food systems: evidence from the Afram Plains, Ghana. *Regional Environmental Change*, 11: 753–765. Available: <https://link.springer.com/article/10.1007/s10113-011-0211-3> (Accessed 1 July 2022).

Cohen, G. H., Tamrakar, S., Lowe, S., Sampson, L., Ettman, C., Kilpatrick, D., Linas, B. P., Ruggiero, K. and Galea, S. 2019. Improved social services and the burden of post-traumatic stress disorder among economically vulnerable people after a natural disaster: A modelling study. *The Lancet Planetary Health*, 3 (2): e93–e101. Available: [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(19\)30012-9/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(19)30012-9/fulltext) (Accessed 4 June 2022).

Conzatti, A., Kershaw, T., Copping, A. and Coley, D. 2022. A review of the impact of shelter design on the health of displaced populations. *Journal of International Humanitarian Action*, 7 (1): 18. Available: <https://link.springer.com/article/10.1186/s41018-022-00123-0> (Accessed 19 November 2022).

Coombs, H. 2022. Case study research: Single or multiple. *White paper*, 1-3. Available: <https://haydencoombs.com/2022/09/16/case-study-research-single-or-multiple/> (Accessed 12 May 2025).

Cornelio, J. and Teehankee, J. C. 2024. Disasters and the rise of global religious philanthropy. *Diogenes*, 65 (1): 131–143. Available: <https://www.cambridge.org/core/journals/diogenes/article/disasters-and-the-rise-of-global-religious-philanthropy/D0300A889B0B8283BCDB7CBBBDA42DBC> (Accessed 12 March 2025).

Council for Scientific and Industrial Research (CSIR). 2019. Flooding: Current state and implications of climate change on flooding in South Africa. In: *GreenBook National Overview*. Pretoria: Council for Scientific and Industrial Research. Available: <https://pta-gis-2-web1.csir.co.za/portal/apps/GBCascade/index.html?appid=33d9a846cf104e1ea86ba1fa3d197cbd> (Accessed 12 July 2022).

Creswell, J. 2023. *The selection of a research approach*. Available: https://in.sagepub.com/sites/default/files/upm-binaries/55588_Chapter_1_Sample_Creswell_Research_Design_4e.pdf. (Accessed 21 September 2023).

Creswell, J. W. and Creswell, J. D. 2018. *Research design: qualitative, quantitative, and mixed methods approaches*. London: Sage publications. Available: https://spada.uns.ac.id/pluginfile.php/510378/mod_resource/content/1/creswell.pdf (Accessed 3 May 2022).

Creswell, J. W. and Poth, C. N. 2018. *Qualitative inquiry and research design: choosing among five approaches*. London: Sage publications. Available: https://pubhtml5.com/enuk/cykh/Creswell_and_Poth%2C_2018%2C_Qualitative_Inquiry_4th/ (Accessed 7 July 2022).

Crick, J. M. 2021. Qualitative research in marketing: what can academics do better? *Journal of Strategic Marketing*, 29 (5): 390–429. Available: <https://www.tandfonline.com/doi/abs/10.1080/0965254X.2020.1743738> (Accessed 19 July 2022).

Cropley, A. 2022. *Qualitative research methods: a practice-oriented introduction*. Bucharest: Editura Intaglio. Available: https://www.researchgate.net/publication/285471178_Qualitative_Research_Methods_A_Practice-Oriented_Introduction (Accessed 3 February 2023).

Cruz-Cano, R. and Mead, E. L. 2019. Causes of excess deaths in Puerto Rico after Hurricane Maria: A time-series estimation. *American Journal of Public Health*, 109 (7): 1050–1052. Available: <https://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2019.305015> (Accessed 9 September 2022).

Cui, P., Peng, J., Shi, P., Tang, H., Ouyang, C., Zou, Q., Liu, L., Li, C. and Lei, Y. 2021. Scientific challenges of research on natural hazards and disaster risk.

Geography and Sustainability, 2 (3): 216–223. Available: <https://www.sciencedirect.com/science/article/pii/S2666683921000390> (Accessed 19 June 2022).

Cutter, S. L., Emrich, C. T., Mitchell, J. T., Boruff, B. J., Gall, M., Schmidtlein, M. C., Burton, C. G. and Melton, G. 2006. The long road home: Race, class, and recovery from Hurricane Katrina. *Environment: Science and Policy for Sustainable Development*, 48 (2): 8–20. Available: <https://www.tandfonline.com/doi/pdf/10.3200/ENVT.48.2.8-20> (Accessed 7 May 2025).

Da Costa, R. and Serradinho, J. 2022. Legal preparedness for disasters: Lessons learned from the South African floods of April 2022. *Disaster Law*, 11 July. Available: <https://disasterlaw.ifrc.org/node/854> (Accessed 18 August 2022).

Daddoust, L., Khankeh, H., Ebadi, A., Sahaf, R., Nakhaei, M. and Asgary, A. 2018. The vulnerability of the Iranian elderly in disasters: Qualitative content analysis. *Iranian Journal of Nursing and Midwifery Research*, 23 (5): 402–408. Available: https://journals.lww.com/jnmr/fulltext/2018/23050/the_vulnerability_of_the_iranian_elderly_in.12.aspx (Accessed 12 April 2022).

Dale, S. K. and Safren, S. A. 2018. Resilience takes a village: Black women utilize support from their community to foster resilience against multiple adversities. *AIDS Care*, 30 (sup5): S18–S26. Available: <https://www.tandfonline.com/doi/abs/10.1080/09540121.2018.1503225> (Accessed 9 September 2022).

Davino, C., Gherghi, M., Sorana, S. and Vistocco, D. 2021. Measuring social vulnerability in an urban space through multivariate methods and models. *Social Indicators Research*, 157 (3): 1179–1201. Available: <https://link.springer.com/article/10.1007/s11205-021-02680-0> (Accessed 12 July 2022).

Dawadi, S. 2020. Thematic Analysis Approach: A step by step guide for ELT research practitioners. *Journal of NELTA*, 25 (1-2): 62–71. Available: <https://nepjol.info/index.php/NELTA/article/view/49731> (Accessed 12 May 2023).

De Jonckheere, M. and Vaughn, L. M. 2019. Semistructured interviewing in primary care research: A balance of relationship and rigour. *Family Medicine and Community Health*, 7 (2): e000057. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC6910737/> (Accessed 19 July 2022).

De Leo, D., Too, L. S., Kõlves, K., Milner, A. and Ide, N. 2013. Has the suicide rate risen with the 2011 Queensland floods? *Journal of Loss and Trauma*, 18 (2): 170–178. Available: <https://www.tandfonline.com/doi/abs/10.1080/15325024.2012.684581> (Accessed 19 July 2022).

De Oliveira, A. K. B., Battemarco, B. P., Barbaro, G., Gomes, M. V. R., Cabral, F. M., de Oliveira Pereira Bezerra, R., de Araújo Rutigliani, V., Lourenço, I. B., Machado, R. K. and Rezende, O. M. 2022. Evaluating the role of urban drainage flaws in triggering cascading effects on critical infrastructure, affecting urban resilience. *Infrastructures*, 7 (11): 153. Available: <https://www.mdpi.com/2412-3811/7/11/153> (Accessed 11 November 2023).

De Vita, C. J., Kramer, F. D., Eyster, L., Hall, S., Kehayova, P. and Triplett, T. 2008. *The role of faith-based and community organizations in post-hurricane human service relief efforts*. Washington, D.C.: Urban Institute. Available: https://www.researchgate.net/publication/267777900_The_Role_of_Faith-Based_and_Community_Organizations_in_Post-Hurricane_Human_Service_Relief_Efforts (Accessed 11 May 2022).

Deak, V. and Mengga, R. C. 2023. The Role of Prayer as Spiritual-Religious Coping in the Healing Process in the Perspective of Christian Psychology. *International Journal of Social and Management Studies*, 4 (4): 54–64. Available: <https://www.ijosmas.org/index.php/ijosmas/article/view/338> (Accessed 3 February 2024).

Deglon, M., Dalvie, M. A. and Abrams, A. 2023. The impact of extreme weather events on mental health in Africa: A scoping review of the evidence. *Science of The Total Environment*, 881: 163420. Available: <https://www.sciencedirect.com/science/article/pii/S0048969723020399> (Accessed 27 April 2025).

Deng, X., Friedman, S., Ryan, I., Zhang, W., Dong, G., Rodriguez, H., Yu, F., Huang, W., Nair, A. and Luo, G. 2022. The independent and synergistic impacts of power outages and floods on hospital admissions for multiple diseases. *Science of The Total Environment*, 828: 154305. Available: <https://www.sciencedirect.com/science/article/pii/S0048969722013973> (Accessed 15 May 2025).

Diakakis, M., Boufidis, N., Grau, J. M. S., Andreadakis, E. and Stamos, I. 2020. A systematic assessment of the effects of extreme flash floods on transportation infrastructure and circulation: The example of the 2017 Mandra flood. *International Journal of Disaster Risk Reduction*, 47: 101542. Available: <https://www.sciencedirect.com/science/article/pii/S2212420919312300> (Accessed 18 April 2023).

DiCicco-Bloom, B. and Crabtree, B. F. 2006. The qualitative research interview. *Medical Education*, 40 (4): 314–321. Available: <https://asmepublications.onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2929.2006.02418.x> (Accessed 17 May 2022).

Dickson, K., Ko, S. Y. J., Nguyen, C., Minchenko, D. and Bangpan, M. 2024. Mental health and psychosocial support programmes for displaced populations in low-and middle-income countries (LMICs): A systematic review of process, perspectives and experiences. *Cambridge Prisms: Global Mental Health*, 11: e62. <https://www.cambridge.org/core/journals/global-mental-health/article/mental-health-and-psychosocial-support-programmes-for-displaced-populations-in-low-and-middleincome-countries-lmics-a-systematic-review-of-process-perspectives-and-experiences/061C80E55AF428379A619805DD6BB1D5> (Accessed 31 August 2024).

Dickson, M., Louis, N. and Jabulani, M. 2022. The importance of social work roles in disaster risk management in Zimbabwe. *Technium Social Sciences Journal*, 27: 717. Available: https://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/techssj27§ion=66 (Accessed 21 December 2022).

Dine, F. and Gasmi, S. 2024. Strengthening critical infrastructure for enhanced urban resilience against natural disasters. *Research*, August 2024: 108. Available: https://www.researchgate.net/publication/382742095_Strengthening_Critical_Infrastructure_for_Enhanced_Urban_Resilience_Against_Natural_Disasters (Accessed 2 May 2025).

Dinh, N. C., Tan, N. Q., Tinh, B. D., Ha, V. H., Kien, N. D., Hung, P. X., Linh, N. H. K. and Phuong, H. T. 2023. Decoding the livelihood vulnerability of flood-prone communities in Vietnam: Implications for disaster risk reduction and sustainable rural development. *Journal of Agriculture and Environment for International Development (JAEID)*, 117 (2): 99–122. Available: <https://www.jaeid.it/index.php/jaeid/article/view/14811> (Accessed 8 March 2024).

Dlamini, S., Nhleko, B. and Ubisi, N. 2024. Understanding socioeconomic risk and vulnerability to climate change–induced disasters: The case of informal settlements in KwaZulu-Natal, South Africa. *Journal of Asian and African Studies*, 1-20. Available: <https://journals.sagepub.com/doi/abs/10.1177/00219096241275398> (Accessed 31 March 2025).

Dodgson, J. E. 2019. Reflexivity in qualitative research. *Journal of human lactation*, 35 (2): 220–222. Available: <https://journals.sagepub.com/doi/abs/10.1177/0890334419830990> (Accessed 18 November 2022).

Drisko, J. 2025. Transferability and generalization in qualitative research. *Research on Social Work Practice*, 35 (1): 102-110. Available:

<https://journals.sagepub.com/doi/10.1177/10497315241256560> (Accessed 19 July 2024).

Du Toit, N. F. 2019. Unapologetically faith based: The nature of donor engagement in the context of South African faith-based organisations. *HTS Teologiese Studies/Theological Studies*, 75 (4): 1-7. Available: <https://www.ajol.info/index.php/hts/article/view/213510> (Accessed 28 August 2022).

Dube, E., Mtapuri, O. and Matunhu, J. 2018. Flooding and poverty: Two interrelated social problems impacting rural development in Tsholotsho district of Matabeleland North province in Zimbabwe. *Jàmbá: Journal of Disaster Risk Studies*, 10 (1): 1–7. Available: <https://journals.co.za/doi/abs/10.4102/jamba.v10i1.455> (Accessed 29 May 2022).

Dube, K., Nhamo, G. and Chikodzi, D. 2021. Flooding trends and their impacts on coastal communities of Western Cape Province, South Africa. *GeoJournal*, 87 (Suppl 4): 453–468. Available: <https://link.springer.com/article/10.1007/s10708-021-10460-z> (Accessed 25 June 2022).

Dunwoodie, K., Macaulay, L. and Newman, A. 2023. Qualitative interviewing in the field of work and organisational psychology: Benefits, challenges and guidelines for researchers and reviewers. *Applied Psychology*, 72 (2): 863–889. Available: <https://iaap-journals.onlinelibrary.wiley.com/doi/abs/10.1111/apps.12414> (Accessed 8 September 2023).

Ebhuoma, E. E., Nene, N. J. and Leonard, L. 2024. Analysis of urban households' preparedness and municipal interventions to build flood resilience in Durban, South Africa: Implications for SDG 11. *Environmental and Sustainability Indicators*, 23: 100454. Available: <https://www.sciencedirect.com/science/article/pii/S2665972724001223> (Accessed 12 December 2024).

Ebi, K. L., Vanos, J., Baldwin, J. W., Bell, J. E., Hondula, D. M., Errett, N. A., Hayes,

K., Reid, C. E., Saha, S. and Spector, J. 2022. Extreme weather and climate change: population health and health system implications. *Annual Review of Public Health*, 42 (1): 293–315. Available:

<https://www.annualreviews.org/content/journals/10.1146/annurev-publhealth-012420-105026> (Accessed 3 June 2022).

Echendu, A. J. 2020. The impact of flooding on Nigeria's sustainable development goals (SDGs). *Ecosystem Health and Sustainability*, 6 (1): 1791735. Available:

<https://spj.science.org/doi/abs/10.1080/20964129.2020.1791735> (Accessed 8 January 2023).

Ede, V. I. 2020. Christianity and Humanitarianism: Assessing the contributions of churches to social welfare in Nigeria. *Oracle of Wisdom Journal of Philosophy and Public Affairs (OWIJOPPA)*, 4 (4). Available:

<https://acjol.org/index.php/owijoppa/article/view/860>
(Accessed 27 September 2022).

Ejem, A. A. and Ben-Enukora, C. A. 2025. Gendered impacts of 2022 floods on livelihoods and health vulnerability of rural communities in select Southern states in Nigeria. *Discover Social Science and Health*, 5 (1): 1–15. Available:

<https://link.springer.com/article/10.1007/s44155-025-00211-7> (Accessed 12 May 2025).

Ejiohuo, O., Onyeaka, H., Unegbu, K. C., Chikezie, O. G., Odeyemi, O. A., Lawal, A. and Odeyemi, O. A. 2024. Nourishing the mind: how food security influences mental wellbeing. *Nutrients*, 16 (4): 501. Available: <https://www.mdpi.com/2072-6643/16/4/501> (Accessed 27 November 2024).

Elfil, M. and Negida, A. 2017. Sampling methods in clinical research; an educational review. *Emergency*, 5 (1): e52. Available:

<https://pmc.ncbi.nlm.nih.gov/articles/PMC5325924/> (Accessed 17 August 2022).

Elimu Bora Working Group. 2024. *The impact of 2024 deadly floods on schools*.

Available: <https://khrc.or.ke/wp-content/uploads/2024/07/The-impact-of-2024-floods-on-schools-final.pdf> (Accessed 2 March 2023).

Elkbuli, A., Herrera, M., Awan, M. and Ellassad, C. 2021. Striving towards an effective emergency preparedness and disaster management response: Lessons learned and future directions. *The American Journal of Emergency Medicine*, 50: 804. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC9758954/> (Accessed 22 June 2023).

Elliott, M. S. J. H. and Webb, P. G. R. 2023. Moved to partner: A case study of faith-based congregations in disaster response. *Journal of Emergency Management*, 21 (1): 37–51. Available: <https://doi.org/10.5055/jem.0712> (Accessed 10 June 2025).

Elliott, V. 2018. Thinking about the coding process in qualitative data analysis. *Qualitative Report*, 23 (11): 2850-2861. Available: <https://ora.ox.ac.uk/objects/uuid:5304bf7f-6214-4939-9f1b-b64415d4fac1> (Accessed 4 April 2023).

Elsanousi, Y. E. A., Elmahi, A. S., Pereira, I. and Debacker, M. 2018. Impact of the 2013 floods on the incidence of malaria in Almanagil Locality, Gezira State, Sudan. *PLoS Currents*, 1-33. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC6209411/> (Accessed 25 February 2023).

Ene, W. R. 2024. Flood Disaster and Family Disorganization in the Niger Delta. *Ubuntu: Journal of Conflict and Social Transformation*, 10 (1&2): 85–97. Available: <https://journals.uj.ac.za/index.php/jcst/article/view/2801> (Accessed 15 November 2024).

Engelman, A., Guzzardo, M. T., Antolin Muñiz, M., Arenas, L. and Gomez, A. 2022. Assessing the emergency response role of community-based organizations (CBOs) serving people with disabilities and older adults in Puerto Rico post-hurricane María and during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, 19 (4): 2156. Available: <https://www.mdpi.com/1660->

4601/19/4/2156 (Accessed 4 January 2023).

Erasmus, D. 2022. Ramaphosa calls KZN floods a 'catastrophe' as death toll climbs above 300. *Daily maverick*, 13 April. Available: <https://www-dailymaverick-co-za.webpkgcache.com/doc/-/s/www.dailymaverick.co.za/article/2022-04-13-ramaphosa-calls-kzn-floods-a-catastrophe-as-death-toll-climbs-above-300/> (Accessed 3 September 2022).

Ergün, D. and Şenyüz, S. 2022. Prolonged grief disorder among bereaved survivors after the 2011 Van Earthquake in Turkey. *Death Studies*, 46 (6): 1364–1371. Available: <https://www.tandfonline.com/doi/abs/10.1080/07481187.2021.1884624> (Accessed 9 March 2024).

Eriksen, C. 2019. Coping, caring and believing: The embodied work of disaster recovery workers. *Emotion, Space and Society*, 32: 100592. Available: <https://www.sciencedirect.com/science/article/pii/S1755458619300155> (Accessed 19 August 2022).

eThekwini municipality. 2023. *eThekwini municipality outline*. Available: https://www.cogta.gov.za/cgta_2016/wp-content/uploads/2023/07/DG-Mbulelo-Tshangana-Disaster-Report.pdf (Accessed 9 August 2023).

eThekwini Municipality. 2024. *Council*. Available: <https://www.durban.gov.za/pages/government/Council> (Accessed 19 July 2024).

eThekwini Municipality. 2025. *Press statements*. Available: <https://www.durban.gov.za/pages/government/media?year=2025> (Accessed 2 May 2025).

Etikan, I., Musa, S. A. and Alkassim, R. S. 2016. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5 (1): 1–4. Available: https://www.academia.edu/download/55796997/Comparison_Convenience_and_Pur

posive_Sampling-2016_4p.pdf (Accessed 26 May 2022).

Etim, E. and Daramola, O. 2020. The informal sector and economic growth of South Africa and Nigeria: A comparative systematic review. *Journal of Open Innovation: Technology, Market, and Complexity*, 6 (4): 134. Available: <https://www.mdpi.com/2199-8531/6/4/134> (Accessed 19 July 2022).

Fallah, S. and Hosseini Nejad, J. 2018. The role of non-governmental organizations in disaster management: A case study of bam earthquake, Iran. *Journal of Disaster and Emergency Research*, 1 (1): 43–50. Available: https://enjournals.ssu.ac.ir/article_36.html (Accessed 19 May 2025).

Fan, J. and Huang, G. 2023. Are women more vulnerable to flooding than men in an aging Japanese society? *International Journal of Environmental Research and Public Health*, 20 (2): 1299. Available: <https://www.mdpi.com/1660-4601/20/2/1299> (Accessed 2 February 2024).

Fatema, S. R., East, L., Islam, S. and Usher, K. 2023. Gender-based vulnerabilities for women during natural disasters in Bangladesh. *Frontiers in Communication*, 8: 1180406. Available: <https://www.frontiersin.org/journals/communication/articles/10.3389/fcomm.2023.1180406/full> (Accessed 27 March 2024).

Fatima, N. and Rana, S. 2017. Repercussion of flood of 2010 on the mental health of Pakistani victims. *Pakistan Journal of Social and Clinical Psychology*, 15 (1): 42–52. Available: <https://www.gcu.edu.pk/pages/gcupress/pjscp/volumes/pjscp20171-6.pdf> (Accessed 27 February 2023).

Fede, S. J., Pearson, E. E., Kerich, M. and Momenan, R. 2021. Charity preferences and perceived impact moderate charitable giving and associated neural response. *Neuropsychologia*, 160: 107957. Available: <https://www.sciencedirect.com/science/article/pii/S0028393221002104> (Accessed 23 August 2023).

Feener, R. M. and Wu, K. 2020. The ethics of religious giving in Asia: Introduction. *Journal of Contemporary Religion*, 35(1), 1–12. Available: <https://www.tandfonline.com/doi/abs/10.1080/13537903.2020.1695789> (Accessed 20 May 2022).

Fernandes, G. C. M., Boehs, A. E., Denham, S. A., Nitschke, R. G. and Martini, J. G. 2017. Rural families' interpretations of experiencing unexpected transition in the wake of a natural disaster. *Cadernos de Saude Publica*, 33 (1): e00161515. Available: <https://www.scielo.br/j/csp/a/QtJ6n8dwvHzF4f5QXmSqYSj/?lang=en> (Accessed 8 March 2024).

Ferris, E. 2005. Faith-based and secular humanitarian organizations. *International Review of the Red Cross*, 87 (858): 311–325. Available: <https://www.cambridge.org/core/journals/international-review-of-the-red-cross/article/faithbased-and-secular-humanitarian-organizations/DFB1BF71A852F8284DB0826CF2948911> (Accessed 20 July 2022).

Fink, A. 2019. *Conducting research literature reviews: From the internet to paper*. London: Sage publications. Available: https://books.google.com/books?hl=en&lr=&id=0z1_DwAAQBAJ&oi=fnd&pg=PP1&ots=16Kui_QXgF&sig=AergbNh783aUgOy0JkMGh2Q-Zfw (Accessed 24 March 2025).

Finucane, M. L., Acosta, J., Wicker, A. and Whipkey, K. 2020. Short-term solutions to a long-term challenge: Rethinking disaster recovery planning to reduce vulnerabilities and inequities. *International Journal of Environmental Research and Public Health*, 17 (2): 482. Available: <https://www.mdpi.com/1660-4601/17/2/482> (Accessed 3 August 2022).

Fishbein, E. M., Frongillo, E. A., Samin, S., Richards, A. L., Blake, C. E., Saunders, R. P. and Shapiro, C. J. 2023. Understanding commitment of local food banks, faith-based organizations, and schools to provide nongovernment food programs. *Current Developments in Nutrition*, 7 (10): 102005. Available:

<https://www.sciencedirect.com/science/article/pii/S2475299123265890> (Accessed 19 February 2024).

Fitchett, J., Hoogendoorn, G. and Swemmer, A. 2016. Economic costs of the 2012 floods on tourism in the Mopani District Municipality, South Africa. *Transactions of the Royal Society of South Africa*, 71 (2): 187–194. Available: <https://www.tandfonline.com/doi/abs/10.1080/0035919X.2016.1167788> (Accessed 27 May 2022).

Fitzgerald, K. C., Pit, S. W., Rolfe, M., McKenzie, J., Matthews, V., Longman, J. and Baillie, R. 2020. Cross sectional analysis of depression amongst Australian rural business owners following cyclone-related flooding. *Journal of Occupational Medicine and Toxicology*, 15: 1–15. Available: <https://link.springer.com/article/10.1186/s12995-020-00264-1> (Accessed 19 July 2022).

Fitzpatrick, K. M., Willis, D. E., Spialek, M. L. and English, E. 2020. Food insecurity in the post-Hurricane Harvey setting: Risks and resources in the midst of uncertainty. *International Journal of Environmental Research and Public Health*, 17 (22): 8424. Available: <https://www.mdpi.com/1660-4601/17/22/8424> (Accessed 7 April 2025).

Flick, U. 2014. *The SAGE handbook of qualitative data analysis*. London: Sage publications. Available: https://books.google.com/books?hl=en&lr=&id=R-6GAwAAQBAJ&oi=fnd&pg=PP1&ots=L76d3_t9Kg&sig=ZHi9kad_RE8tONdxLX4tNMm2La4 (Accessed 21 March 2022).

Flick, U. 2024. *Designing qualitative research*. London: Sage publications. Available: <https://methods.sagepub.com/book/mono/preview/designing-qualitative-research-2e.pdf> (Accessed 28 January 2025).

Forero, R., Nahidi, S., De Costa, J., Mohsin, M., Fitzgerald, G., Gibson, N., McCarthy, S. and Aboagye-Sarfo, P. 2018. Application of four-dimension criteria to assess rigour of qualitative research in emergency medicine. *BMC Health Services*

Research, 18: 1–11. Available: <https://link.springer.com/article/10.1186/s12913-018-2915-2> (Accessed 6 January 2023).

Frasqueri-Quintana, V. M., García, C. A. O., Adams, L. E., Torres-Figueroa, X., Iriarte, R. I., Ryff, K., Sánchez-González, L., Gómez, V. P., Pérez-Rodríguez, N. M. and Alvarado, L. I. 2019. Injury-related emergency department visits after Hurricane Maria in a southern Puerto Rico hospital. *Disaster Medicine and Public Health Preparedness*, 14 (1): 63–70. Available: <https://www.cambridge.org/core/journals/disaster-medicine-and-public-health-preparedness/article/injuryrelated-emergency-department-visits-after-hurricane-maria-in-a-southern-puerto-rico-hospital/DACFDEA50A4EAA616F2D245C8AC0F2FD> (Accessed 14 April 2022).

Fredman, S. J., Monson, C. M., Schumm, J. A., Adair, K. C., Taft, C. T. and Resick, P. A. 2010. Associations among disaster exposure, intimate relationship adjustment, and PTSD symptoms: Can disaster exposure enhance a relationship? *Journal of Traumatic Stress*, 23 (4): 446–451. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/jts.20555> (Accessed 1 September 2022).

Frechette, J., Bitzas, V., Aubry, M., Kilpatrick, K. and Lavoie-Tremblay, M. 2020. Capturing lived experience: Methodological considerations for interpretive phenomenological inquiry. *International Journal of Qualitative Methods*, 19: 1-12. Available: <https://journals.sagepub.com/doi/abs/10.1177/1609406920907254> (Accessed: 9 July 2022).

Gagné, I. 2020. Dislocation, social isolation, and the politics of recovery in post-disaster Japan. *Transcultural Psychiatry*, 57 (5): 710–723. Available: <https://journals.sagepub.com/doi/abs/10.1177/1363461520920348> (Accessed 12 February 2024).

Gajanayake, A., Khan, T. and Zhang, G. 2020. Post-disaster reconstruction of road infrastructure: Decision making processes in an Australian context. *European*

Journal of Transport and Infrastructure Research, 20 (1): 1–16. Available: <https://journals.open.tudelft.nl/ejtir/article/view/3919> (Accessed 5 September 2023).

Gannon, K. E., Conway, D., Pardoe, J., Ndiyoi, M., Batisani, N., Odada, E., Olago, D., Opere, A., Kgosietsile, S. and Nyambe, M. 2018. Business experience of floods and drought-related water and electricity supply disruption in three cities in sub-Saharan Africa during the 2015/2016 El Niño. *Global Sustainability*, 1: e14. Available: <https://www.cambridge.org/core/journals/global-sustainability/article/business-experience-of-floods-and-drought-related-water-and-electricity-supply-disruption-in-three-cities-in-sub-saharan-africa-during-the-20152016-el-nino/4E87FAB6F1703FB2558CB2D0EE9845E2> (Accessed 22 September 2022).

Ganoe, M., Roslida, J. and Sihotang, T. 2023. The impact of volunteerism on community resilience in disaster management. *Jurnal Ilmu Pendidikan dan Humaniora*, 12 (3): 199–213. Available: <https://journals.ristek.or.id/index.php/jiph/article/view/11> (Accessed 9 January 2024).

García, I. and Hernandez, N. 2023. “They're just trying to survive”: The relationship between social vulnerability, informal housing, and environmental risks in Loíza, Puerto Rico, USA. *World Development Sustainability*, 2: 100062. Available: <https://doi.org/10.1016/j.wds.2023.100062> (Accessed 14 September 2023).

Gardner, D. 2018. *South African Urbanisation Review. Analysis of the Human Settlement Programme and Subsidy Instruments*. Washington, D.C.: The World Bank. Available: <https://www.ukesa.info/download/WYf9bZIKhuvnXAojQPmy31epHlaEJBGg/Paper-6-Analysis-of-HS-Programme.pdf> (Accessed 11 March 2023).

Garg, R. 2016. Methodology for research I. *Indian Journal of Anaesthesia*, 60 (9): 640–645. Available: https://journals.lww.com/ijaweb/fulltext/2016/60090/methodology_for_research_i.6.aspx (Accessed 14 August 2022).

Gartrell, A., Calgaro, E., Goddard, G. and Saorath, N. 2020. Disaster experiences of women with disabilities: Barriers and opportunities for disability inclusive disaster risk reduction in Cambodia. *Global Environmental Change*, 64: 102134. Available: <https://www.sciencedirect.com/science/article/pii/S0959378020307172> (Accessed 5 January 2024).

Gautam, K. and van der Hoek, E. 2003. *Literature study on environmental impact of floods*. Netherlands: Delft Cluster. Available: https://repository.tudelft.nl/file/File_c865903a-5346-4651-8536-855bddcdcbd1?preview=1 (Accessed 2 June 2022).

Gerstner, R. M., Lara-Lara, F., Vasconez, E., Viscor, G., Jarrin, J. D. and Ortiz-Prado, E. 2020. Earthquake-related stressors associated with suicidality, depression, anxiety and post-traumatic stress in adolescents from Muisne after the earthquake 2016 in Ecuador. *BMC Psychiatry*, 20: 1–9. Available: <https://link.springer.com/article/10.1186/s12888-020-02759-x> (Accessed 31 March 2022).

Ghanad, A. 2023. An overview of quantitative research methods. *International Journal of Multidisciplinary Research and Analysis*, 6 (08): 3794–3803. Available: https://www.researchgate.net/profile/Anahita-Ghanad/publication/373370007_An_Overview_of_Quantitative_Research_Methods/links/67b28ffc645ef274a48341a1/An-Overview-of-Quantitative-Research-Methods.pdf (Accessed 8 January 2024).

Ghazanchaei, E., Khorasani-Zavareh, D., Aghazadeh-Attari, J. and Mohebbi, I. 2021. Identifying and describing impact of disasters on non-communicable diseases: A systematic review. *Iranian Journal of Public Health*, 50 (6): 1143. Available: <https://pubmed.ncbi.nlm.nih.gov/33583461/> (Accessed 24 August 2022).

Gibberd, J. T. 2020. A sustainability specification for emergency housing. In: *9th International Conference on Appropriate Technology*, Pretoria, South Africa, 25-28

November 2020. Available:

https://www.researchgate.net/publication/350577196_A_Sustainability_Specification_for_Emergency_Housing (Accessed 24 March 2022).

Gilchrist, A. and Taylor, M. 2016. *The short guide to community development*.

Bristol: Bristol University Policy Press. Available:

https://books.google.com/books?hl=en&lr=&id=cfzDCwAAQBAJ&oi=fnd&pg=PA1&ots=mhJ8sgyS0p&sig=hBWU7IHzzh3I-tCg_jAtENYvyo (Accessed 15 March 2024).

Given, L. M. 2008. *The Sage Encyclopedia of Qualitative Research Methods*.

London: Sage publications. Available:

<https://books.google.com/books?hl=en&lr=&id=byh1AwAAQBAJ&oi=fnd&pg=PP1&ots=LQUUSN5H6l&sig=6SZIYR5ynUuPE2p0O4xRZ09sCRM> (Accessed 22 May 2022).

Glass, K., Flory, K., Hankin, B. L., Kloos, B. and Turecki, G. 2009. Are coping strategies, social support, and hope associated with psychological distress among Hurricane Katrina survivors? *Journal of Social and Clinical Psychology*, 28 (6): 779–795. Available: <https://guilfordjournals.com/doi/abs/10.1521/jscp.2009.28.6.779> (Accessed 19 May 2023).

Goldschmidt, K. H. and Kumar, S. 2016. Humanitarian operations and crisis/disaster management: A retrospective review of the literature and framework for development. *International Journal of Disaster Risk Reduction*, 20: 1–13. Available:

<https://www.sciencedirect.com/science/article/pii/S2212420916301340> (Accessed 16 March 2023).

Golitaleb, M., Mazaheri, E., Bonyadi, M. and Sahebi, A. 2022. Prevalence of post-traumatic stress disorder after flood: A systematic review and meta-analysis.

Frontiers in Psychiatry, 13: 890671. Available:

<https://www.frontiersin.org/articles/10.3389/fpsy.2022.890671/full> (Accessed 14 December 2022).

Golzar, J., Noor, S. and Tajik, O. 2022. Convenience sampling. *International Journal of Education and Language Studies*, 1 (2): 72–77. Available: https://www.ijels.net/article_162981.html (Accessed 19 February 2023).

Goniewicz, K., Sarker, M. N. I. and Schoch-Spana, M. 2023. Reimagining natural hazards and disaster preparedness: Charting a new course for the future. *BMC Public Health*, 23 (1): 581. Available: <https://link.springer.com/article/10.1186/s12889-023-15497-y> (Accessed 21 February 2023).

Goo, D. 2024. The essence of displacement: A phenomenological analysis of inner-city residents' experiences in South Africa. *Indo-Pacific Journal of Phenomenology*, 24 (1): e2343675. Available: 10.1080/20797222.2024.2343675 (Accessed 4 July 2024).

Goodwin, E. and Kraft, K. 2022. Mental health and spiritual well-being in humanitarian crises: the role of faith communities providing spiritual and psychosocial support during the COVID-19 pandemic. *Journal of International Humanitarian Action*, 7 (1): 21. Available: <https://link.springer.com/article/10.1186/s41018-022-00127-w> (Accessed 9 April 2023).

Govender, I. H., Reddy, M. and Pillay, R. P. 2025. A review of residual flood risks in South African-vulnerable coastal communities: Opportunities to influence policy. In: Yohe, G. and Smith, J. eds. *Climate Policies - Modern Risk-Based Assessment of Investments in Mitigation, Adaptation, and Recovery from Residual Harm*. London: IntechOpen. Available: <https://www.intechopen.com/online-first/1207389> (Accessed 3 May 2025).

Grab, S. W. and Nash, D. J. 2023. A new flood chronology for KwaZulu-Natal (1836–2022): The April 2022 Durban floods in historical context. *South African Geographical Journal*, 106 (4): 476–497. Available: <https://www.tandfonline.com/doi/abs/10.1080/03736245.2023.2193758> (Accessed 19

April 2024).

Grabich, S. C., Robinson, W. R., Engel, S. M., Konrad, C. E., Richardson, D. B. and Horney, J. A. 2016. Hurricane Charley exposure and hazard of preterm delivery, Florida 2004. *Maternal and Child Health Journal*, 20: 2474–2482. Available: <https://link.springer.com/article/10.1007/s10995-016-2069-y> (Accessed 22 June 2022).

Graham, H., White, P., Cotton, J. and McManus, S. 2019. Flood and weather-damaged homes and mental health: An analysis using England's mental health survey. *International Journal of Environmental Research and Public Health*, 16 (18): 3256. Available: <https://www.mdpi.com/1660-4601/16/18/3256> (Accessed 23 March 2022).

Gray, J. R., Grove, S. K. and Sutherland, S. 2017. *Burns and Grove's the practice of Nursing Research-E-book: Appraisal, synthesis, and generation of evidence*. St. Louis, Missouri: Elsevier Health Sciences. Available: https://books.google.com/books?hl=en&lr=&id=oD_UDAAAQBAJ&oi=fnd&pg=PP1&ots=yIXSR6nyjM&sig=pqGc6R1NgXxRFH3HiTpADYp4VKE (Accessed 21 July 2022).

Gul, S., Khan, N., Nisar, S., Ali, Z. and Ullah, U. 2024. Impact of climate change-induced flood on women's life: A case study of 2022 flood in District Nowshera, Khyber Pakhtunkhwa, Pakistan. *Journal of Asian Development Studies*, 13 (2): 1468–1482. Available: <https://poverty.com.pk/index.php/Journal/article/view/624> (Accessed 12 March 2025).

Guerrero, A., Bodin, Ö., Nohrstedt, D., Plummer, R., Baird, J. and Summers, R. 2023. Collaboration and individual performance during disaster response. *Global Environmental Change*, 82: 102729. Available: <https://www.sciencedirect.com/science/article/pii/S095937802300095X> (Accessed 8 March 2024).

Guilaran, J., de Terte, I., Kaniasty, K. and Stephens, C. 2018. Psychological

outcomes in disaster responders: A systematic review and meta-analysis on the effect of social support. *International Journal of Disaster Risk Science*, 9: 344–358. Available: <https://link.springer.com/article/10.1007/s13753-018-0184-7> (Accessed 27 May 2022).

Gunawan, J. 2015. Ensuring trustworthiness in qualitative research. *Belitung Nursing Journal*, 1 (1): 10–11. Available: <https://www.belitungraya.org/BRP/index.php/bnj/article/download/4/9> (Accessed 29 June 2022).

Guo, J., Liu, C., Kong, D., Solomon, P. and Fu, M. 2018. The relationship between PTSD and suicidality among Wenchuan earthquake survivors: The role of PTG and social support. *Journal of Affective Disorders*, 235: 90–95. Available: <https://www.sciencedirect.com/science/article/pii/S0165032717325557> (Accessed 8 June 2022).

Gurtner, Y. and King, D. 2021. Chapter 29 - Socio-economic vulnerabilities to natural disasters and social justice. In: *Economic Effects of Natural Disasters*. Academic Press. Available: <https://www.sciencedirect.com/science/article/pii/B9780128174654000297> (Accessed 16 June 2022).

Ha, K.M. 2015. The role of religious beliefs and institutions in disaster management: A case study. *Religions*, 6 (4): 1314–1329. Available: <https://www.mdpi.com/2077-1444/6/4/1314> (Accessed 19 October 2022).

Habibisaravi, R., Assadi, T., Gholami, G., Hasani, M., Pourmand, S., Navaie, R. and Ghasemihamedani, F. 2022. Flood and hypertension: A systematic review. *Research in Cardiovascular Medicine*, 11 (1): 1–5. Available: https://journals.lww.com/RCVM/fulltext/2022/11010/Flood_and_Hypertension__A_Systematic_Review.1.aspx (Accessed 14 October 2023).

Hadley, K., Wheat, S., Rogers, H. H., Balakumar, A., Gonzales-Pacheco, D., Davis, S. S., Linstadt, H., Cushing, T., Ziska, L. H. and Piper, C. 2023. Mechanisms

underlying food insecurity in the aftermath of climate-related shocks: A systematic review. *The Lancet Planetary Health*, 7 (3): e242–e250. Available: [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(23\)00003-7/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(23)00003-7/fulltext) (Accessed 3 November 2023).

Hahn, M. B., Van Wyck, R., Lessard, L. and Fried, R. 2022. Compounding effects of social vulnerability and recurring natural disasters on mental and physical health. *Disaster Medicine and Public Health Preparedness*, 16 (3): 1–9. Available: https://micahbhahn.wordpress.com/wp-content/uploads/2021/04/hahn2021_compounding-effects-of-social-vulnerability-and-recurring-natural-disasters-on-mental-and-physical-health.pdf (Accessed 9 May 2023).

Hallegatte, S. and Walsh, B. 2021. *Natural disasters, poverty and inequality: New metrics for fairer policies*. Washington, D.C.: Routledge. Available: <https://www.taylorfrancis.com/chapters/edit/10.4324/9780367814533-10/natural-disasters-poverty-inequality-st%C3%A9phane-hallegatte-brian-walsh> (Accessed 5 January 2023).

Hamdi, W. B., Aderibigbe, S. A., Idriz, M. and Alghfeli, M. M. 2024. Faith in humanity: Religious charitable organizations solidarity towards migrants in the United Arab Emirates. *Religions*, 15 (3): 266. Available: <https://www.mdpi.com/2077-1444/15/3/266> (Accessed 29 July 2024).

Han, Y., Huang, Q., He, C., Fang, Y., Wen, J., Gao, J. and Du, S. 2020. The growth mode of built-up land in floodplains and its impacts on flood vulnerability. *Science of the Total Environment*, 700: 134462. Available: <https://www.sciencedirect.com/science/article/pii/S0048969719344535> (Accessed 7 September 2022).

Hanchey, A. 2021. Notes from the field: Deaths related to Hurricane Ida reported by media—nine states, August 29–September 9, 2021. *MMWR. Morbidity and Mortality Weekly Report*, 70(39): 1385–1386. Available:

<https://www.cdc.gov/mmwr/volumes/70/wr/mm7039a3.htm> (Accessed 8 March 2024).

Hansa, J. and Venkatachalapathi, S. B. 2017. Socio-cultural factors influencing women to be more vulnerable in natural disasters: A qualitative review on Tamil Nadu state. *International Journal of Applied Research and Studies*, 6(11): 1-8. Available: https://www.researchgate.net/publication/321872206_Socio-cultural_Factors_Influencing_Women_to_be_more_vulnerable_in_Natural_Disasters_A_Qualitative_Review_on_Tamil_Nadu_state (Accessed 14 May 2022).

Harpci, F. 2020. Who is my neighbor? Philanthropy in light of the prophetic model. *Journal of Muslim Philanthropy & Civil Society*, 4 (2): 3–27. Available: <https://scholarworks.iu.edu/iupjournals/index.php/muslimphilanthropy/article/view/1952> (Accessed 22 February 2023).

Harville, E. W., Taylor, C. A., Tesfai, H., Xiong, X. and Buekens, P. 2011. Experience of Hurricane Katrina and reported intimate partner violence. *Journal of Interpersonal Violence*, 26 (4): 833–845. Available: <https://journals.sagepub.com/doi/abs/10.1177/0886260510365861> (Accessed 18 May 2022).

Hassan, S., Nguyen, M., Buchanan, M., Grimshaw, A., Adams, O.P., Hassell, T., Ragster, L. and Nunez-Smith, M. 2020. Management of chronic non-communicable diseases after natural disasters in the Caribbean: A Scoping Review: A scoping review of literature published between 1974 and 2020 examining the burden and management of chronic non-communicable diseases after natural disasters in the Caribbean. *Health Affairs*, 39(12): 2136-2143. Available: <https://www.healthaffairs.org/doi/abs/10.1377/hlthaff.2020.01119> 9Accessed: 28 September 2022).

Hassan, E. M. and Mahmoud, H. 2021. Healthcare and education networks interaction as an indicator of social services stability following natural disasters. *Scientific Reports*, 11 (1): 1664. Available: <https://www.nature.com/articles/s41598->

021-81130-w (Accessed 29 March 2022).

Hattingh, M. 2022. What did cause the April KZN floods? *Water Wheel*, 21 (4): 24–27. Available: <https://journals.co.za/doi/pdf/10.10520/ejc-waterb-v21-n4-a5> (Accessed 3 January 2023).

Hay, K. and Pascoe, K. M. 2022. Engaging social workers in disaster management: Case studies from New Zealand. *International Journal of Disaster Risk Reduction*, 74: 102941. Available: <https://www.sciencedirect.com/science/article/pii/S2212420922001601> (Accessed 20 May 2022).

Hay, K., Pascoe, K. M. and McCafferty, L. 2021. Qualitative research: Social worker experiences in disaster management: Case studies from Aotearoa New Zealand. *Aotearoa New Zealand Social Work*, 33 (1): 17–28. Available: <https://search.informit.org/doi/abs/10.3316/informit.827490271737453> (Accessed 25 May 2022).

Hayes, J., Don, Jhaveri, M. A., Mannino, D. M., Strawbridge, H. and Temprano, J. 2013. The effect of mold sensitization and humidity upon allergic asthma. *The Clinical Respiratory Journal*, 7 (2): 135–144. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1752-699X.2012.00294.x> (Accessed 24 August 2022).

He, Y., Thies, S., Avner, P. and Rentschler, J. 2020. *The impact of flooding on urban transit and accessibility: A case study of Kinshasa*. Washington, D.C.: The World Bank. Available: <https://ideas.repec.org/p/wbk/wbrwps/9504.html> (Accessed 6 March 2024).

Heanoy, E. Z. and Brown, N. R. 2024. Impact of natural disasters on mental health: Evidence and implications. *Healthcare*, 12(18): 1812. Available: <https://www.mdpi.com/2227-9032/12/18/1812> (Accessed 28 January 2025).

Hebebcı, M. T. 2023. The impact of natural disasters on education. In: *3rd International Conference on Social Science 2023*. Marmaris, Turkey, 27-20 April 2023, Available: https://www.researchgate.net/publication/375238926_The_Impact_of_Natural_Disasters_on_Education (Accessed 12 June 2025).

Hennink, M. and Kaiser, B. N. 2022. Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, 292: 114523. Available: <https://www.sciencedirect.com/science/article/pii/S0277953621008558> (Accessed 8 May 2022).

Hesselman, M. and Lane, L. 2017. Disasters and non-state actors—human rights-based approaches. *Disaster Prevention and Management*, 26 (5): 526–539. Available: <https://www.emerald.com/insight/content/doi/10.1108/dpm-07-2017-0174/full/html> (Accessed 7 May 2025).

Hettige, S. and Haigh, R. 2016. An integrated social response to disasters: The case of the Indian Ocean tsunami in Sri Lanka. *Disaster Prevention and Management: An International Journal*, 25 (5): 595–610. Available: <https://www.emerald.com/insight/content/doi/10.1108/dpm-11-2015-0263/full/html> (Accessed 28 May 2022).

Hewawasam, V. and Matsui, K. 2023. Small and medium-sized entrepreneurs' perceptions of flood loss and damage in Sri Lanka. *Climate*, 11 (8): 157. Available: <https://www.mdpi.com/2225-1154/11/8/157> (Accessed 12 November 2023).

Hiebert, J., Cai, J., Hwang, S., Morris, A. K. and Hohensee, C. 2023. Significance of a study: Revisiting the “so what” question. In: *Doing Research: A New Researcher's Guide. Research in Mathematics Education*. Cham: Springer. Available: https://link.springer.com/chapter/10.1007/978-3-031-19078-0_5 (Accessed 12 February 2024).

Hieronimi, A., Elbel, J., Schneider, M., Wermuth, I., Schulte-Körne, G., Nowak, D.

and Bose-O'Reilly, S. 2022. A qualitative study to explain the factors influencing mental health after a flooding. *International Journal of Environmental Research and Public Health*, 20 (1): 134. Available: <https://www.mdpi.com/1660-4601/20/1/134> (Accessed 16 April 2023).

Hilditch, C.J., Dorrian, J. and Banks, S., 2016. Time to wake up: reactive countermeasures to sleep inertia. *Industrial health*, 54(6): 528-541. Available: https://www.jstage.jst.go.jp/article/indhealth/54/6/54_2015-0236/_article/-char/ja/ (Accessed: 17 August 2022).

Hino, M., K., B. T., Jordan, B., Nikhil, K., Antonia, S. and Sweeney, S. 2024. Growing safely or building risk? *Journal of the American Planning Association*, 90 (1): 50–62. Available: 10.1080/01944363.2022.2141821 (Accessed 5 March 2023).

Hirono, T. and Blake, M. E. 2017. The role of religious leaders in the restoration of hope following natural disasters. *Sage open*, 7 (2): 1-15. Available: <https://journals.sagepub.com/doi/abs/10.1177/2158244017707003> (Accessed 2 October 2023).

Hobfoll, S. E. 2009. *Conservation of resources theory: Stress and trauma*. Available: <https://psycnet.apa.org/get-pe-doi.cfm?doi=10.1037/e538952013-002> (Accessed 30 June 2022).

Hogg, A. 2020. GG Alcock: Time to recognise millions in SA's flourishing informal economy. *Biznews.com*, 22 August 2019. Available: <https://www.biznews.com/good-hope-project/gg-alcock-recognise-informal-economy#:~:text=Good%20Hope-,GG%20Alcock%3A%20Time%20to%20recognise%20millions%20in%20SA's%20flourishing%20informal,thought%20process%20to%20his%20fellows.> (Accessed 25 April 2022).

Holm-Nielsen, P. V., Raju, E. and Furu, P. 2022. The transformative effect of cash and voucher assistance experienced by humanitarian organizations. *International Journal of Disaster Risk Reduction*, 80: 103238. Available:

<https://doi.org/10.1016/j.ijdr.2022.103238> (Accessed 3 November 2022).

Hossain, A., Ahmed, B., Rahman, T., Sammonds, P., Zaman, S., Benzadid, S. and Jakariya, M. 2021. Household food insecurity, income loss, and symptoms of psychological distress among adults following the Cyclone Amphan in coastal Bangladesh. *PLoS One*, 16 (11): e0259098. Available: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0259098> (Accessed 2 June 2022).

Hossan, D., Dato'Mansor, Z. and Jaharuddin, N. S. 2023. Research population and sampling in quantitative study. *International Journal of Business and Technopreneurship (IJBT)*, 13 (3): 209–222. Available: <https://ejournal.unimap.edu.my/index.php/ijbt/article/view/263> (Accessed 12 November 2023).

Howard, A., Agllias, K., Bevis, M. and Blakemore, T. 2018. How social isolation affects disaster preparedness and response in Australia: Implications for social work. *Australian Social Work*, 71 (4): 392–404. Available: <https://www.tandfonline.com/doi/abs/10.1080/0312407X.2018.1487461> (Accessed 8 September 2022).

Huang, L.Y., Wang, Y.C., Wu, C.C., Chen, Y.C. and Huang, Y.L. 2016. Risk of flood-related diseases of eyes, skin and gastrointestinal tract in Taiwan: A retrospective cohort study. *PloS one*, 11 (5): e0155166. Available: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0155166> (Accessed 7 July 2022).

Huang, X., Yin, J., Slater, L. J., Kang, S., He, S. and Liu, P. 2024. Global projection of flood risk with a bivariate framework under 1.5–3.0 C warming levels. *Earth's Future*, 12 (4): e2023EF004312. Available: <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2023EF004312> (Accessed 3 December 2024).

Huesler, J. 2024. *Impact of natural disasters on school attendance: A comparative study from colonial Jamaica*. EHES Working Paper No. 264. Available: <https://www.econstor.eu/handle/10419/302253> (Accessed 12 June 2025).

Ide, Y. and Beddoe, L. 2024. Challenging perspectives: Reflexivity as a critical approach to qualitative social work research. *Qualitative Social Work*, 23 (4): 725–740. Available: <https://journals.sagepub.com/doi/abs/10.1177/14733250231173522> (Accessed 29 December 2022).

Internal Displacement Monitoring Centre. 2018. *Systematic data collection and monitoring of displacement and its impacts at local, national, regional and international level to inform comprehensive needs and risk assessments for the formulation of policy and plans*. Available: <https://unfccc.int/sites/default/files/resource/WIM%20TFD%20III.1-3%20Output.pdf> (Accessed 21 November 2022).

Internal Displacement Monitoring Centre. 2022. *Children and youth in internal displacement*. Available: https://www.internal-displacement.org/sites/default/files/publications/documents/IDMC_GRID_2022_LR.pdf (Accessed 15 November 2024).

International committee of the Red Cross (ICRC). 2022. *The fundamental principles*. Available: https://www.icrc.org/sites/default/files/topic/file_plus_list/4046-the_fundamental_principles_of_the_international_red_cross_and_red_crescent_movement.pdf (Accessed 2 July 2022).

International disaster database. 2024. *Monitoring hazards & disasters worldwide since 1988*. Available: <https://www.emdat.be/> (Accessed 8 November 2024).

Iqbal, A. and Sheikh, A. 2023. The devastating earthquake that struck Turkey and Syria: Post-traumatic stress disorder and mental health issues among the victims. *The International Journal of Health Planning and Management*, 38 (4): 1080–1083. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/hpm.3644> (Accessed 12

November 2023).

Issa, A., Ramadugu, K., Mulay, P., Hamilton, J., Siegel, V., Harrison, C., Campbell, C. M., Blackmore, C., Bayleyegn, T. and Boehmer, T. 2018. Deaths related to Hurricane Irma - Florida, Georgia, and North Carolina, September 4-October 10, 2017. *MMWR Morbidity Mortality Weekly Report*, 67 (30): 829–832. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC6072056/> (Accessed 19 June 2022).

Jacinto, E., Figueiredo Dalla Costa Ames, M. C., Serafim, M. C. and Zappellini, M. B. 2023. Religion-spirituality influences in the governance of faith-based organizations during the COVID pandemic. *Public Organization Review*, 23 (2): 531–550. Available: 10.1007/s11115-023-00704-6 (Accessed 7 August 2023).

Jahani, R. and Parayandeh, M. Y. 2024. The role of faith-based organizations in social service provision. *Interdisciplinary Studies in Society, Law, and Politics*, 3 (3): 12–19. Available: <http://193.36.85.187:8089/index.php/isslp/article/view/55> (Accessed 15 December 2024).

James, N. 2023. The effects of climate change on informal settlements - Commentary by Nokwenama James, 31 January 2023. *Town and Regional Planning*, 82: 1–3. Available: https://www.scielo.org.za/scielo.php?pid=S2415-04952023000100002&script=sci_arttext (Accessed 15 December 2024).

Jamieson, M. K., Govaart, G. H. and Pownall, M. 2023. Reflexivity in quantitative research: A rationale and beginner's guide. *Social and Personality Psychology Compass*, 17 (4): e12735. Available: <https://doi.org/10.1111/spc3.12735> (Accessed 5 June 2023).

Jamrussri, S. and Toda, Y. 2018. Available flood evacuation time for high-risk areas in the middle reach of Chao Phraya River Basin. *Water*, 10 (12): 1871. Available: <https://www.mdpi.com/2073-4441/10/12/1871> (Accessed 19 July 2023).

Jean-Baptiste, N., Olivotto, V., Porio, E. E., Kombe, W., Yulo-Loyzaga, A., Gencer,

E., Leone, M., Lucon, O. and Natty, M. 2018. Housing and Informal Settlements. In: Rosenzweig, C., Solecki, W., Romero-Lankao, P., Mehrotra, S., Dhakal, S. and Ali Ibrahim, S. eds. *Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network*. New York: Cambridge University Press, 399–440. Available: <https://archium.ateneo.edu/cgi/viewcontent.cgi?article=1078&context=sa-faculty-pubs> (Accessed 29 August 2022).

Jena, S. K. and Ranjan, R. 2015. Faith and Philanthropy: Exploring the role of FBOs in disasters. *International Research Journal of Management Sociology and Humanities* 6(6): 27-42. Available: <http://www.irjmsh.com/certificate?id=3091> (Accessed 5 March 2022).

Jenkins, J. L., McCarthy, M., Kelen, G., Sauer, L. M. and Kirsch, T. 2009. Changes needed in the care for sheltered persons: A multistate analysis from Hurricane Katrina. *American Journal of Disaster Medicine*, 4 (2): 101–106. Available: (Accessed 9 August 2022).

Jermacane, D., Waite, T. D., Beck, C. R., Bone, A., Amlôt, R., Reacher, M., Kovats, S., Armstrong, B., Leonardi, G. and James Rubin, G. 2018. The English national cohort study of flooding and health: The change in the prevalence of psychological morbidity at year two. *BMC public health*, 18: 1–8. Available: <https://link.springer.com/article/10.1186/s12889-018-5236-9> (Accessed 2 July 2022).

Jessel, S., Sawyer, S. and Hernández, D. 2019. Energy, poverty, and health in climate change: A comprehensive review of an emerging literature. *Frontiers in Public Health*, 7: 1-19. Available: 10.3389/fpubh.2019.00357 (Accessed 4 June 2022).

Jewkes, R., Gibbs, A., Mkhwanazi, S., Zembe, A., Khoza, Z., Mnandi, N. and Washington, L. 2023. Impact of South Africa's April 2022 floods on women and men's lives and gender relations in low-income communities: A qualitative study.

SSM - Mental Health, 4: 1-9. Available:

<https://www.sciencedirect.com/science/article/pii/S2666560323000701> (Accessed 14 February 2024).

Jia, J. S., Li, Y., Lu, X., Ning, Y., Christakis, N. A. and Jia, J. 2021. Triadic embeddedness structure in family networks predicts mobile communication response to a sudden natural disaster. *Nature communications*, 12 (1): 4286. Available: <https://www.nature.com/articles/s41467-021-24606-7> (Accessed 27 January 2023).

Joerin, J., Steinberger, F., Krishnamurthy, R. R. and Scolobig, A. 2018. Disaster recovery processes: Analysing the interplay between communities and authorities in Chennai, India. *Procedia engineering*, 212: 643–650. Available: <https://www.sciencedirect.com/science/article/pii/S1877705818301012> (Accessed 9 June 2023).

John, R. 2020. Flooding in informal settlements: potentials and limits for household adaptation in Dar es Salaam City, Tanzania. *American Journal of Climate Change*, 9 (2): 68. Available: https://www.scirp.org/html/2-2360813_99987.htm (Accessed 18 November 2022).

Jonathan, A., Owolabi, M., Olatunji, I., Duntoye, B. and Henshaw, E. 2020. Economic analysis of the effect of flood disaster on food security of arable farming households in Southern Guinea Savanna Zone, Nigeria. *Journal of Agriculture and Food Sciences*, 18 (1): 60–70. Available: <https://www.ajol.info/index.php/jafs/article/view/198757> (Accessed 4 April 2022).

Joubert, L. 2023. A Perfect Storm: How the deadly 2022 Durban floods hold crucial lessons for the future of the city and others like it. *Daily Maverick*, 10 May 2023. Available: <https://www.dailymaverick.co.za/article/2023-05-10-a-perfect-storm-how-the-deadly-2022-durban-floods-hold-crucial-lessons-for-the-future-of-the-city-and-others-like-it/> (Accessed 5 August 2023).

Kabanda, T. 2020. GIS modeling of flooding exposure in Dar es Salaam coastal

areas. *African Geographical Review*, 39 (2): 134–143. Available: <https://www.tandfonline.com/doi/abs/10.1080/19376812.2019.1650082> (Accessed 9 August 2022).

Kabir, H. and Hossen, M. N. 2019. Impacts of flood and its possible solution in Bangladesh. *Disaster Advances*, 12 (10): 48–57. Available: https://www.researchgate.net/profile/Md-Kabir-34/publication/336146425_Impacts_of_flood_and_its_possible_solution_in_Bangladesh/links/5d928a8f92851c33e94b3810/Impacts-of-flood-and-its-possible-solution-in-Bangladesh.pdf (Accessed 12 July 2022).

Kabir, S. 2016. Methods of data collection. In: *Basic Guidelines for Research: An Introductory Approach for All Disciplines*. Chittagong: Chittagong, 201-269. Available: https://www.researchgate.net/publication/325846997_METHODS_OF_DATA_COLLECTION (Accessed 19 July 2022).

Kakar, H. Z. U., Rasheed, R., Rashid, A. and Akhter, S. 2023. Criteria for assessing and ensuring the trustworthiness in qualitative research. *International Journal of Business Reflections*, 4 (2): 150-173. Available: https://academicworks.cuny.edu/cgi/viewcontent.cgi?article=1386&context=yc_pubs (Accessed 8 January 2024).

Kakinuma, K., Puma, M. J., Hirabayashi, Y., Tanoue, M., Baptista, E. A. and Kanae, S. 2020. Flood-induced population displacements in the world. *Environmental Research Letters*, 15 (12): 124029. Available: <https://iopscience.iop.org/article/10.1088/1748-9326/abc586> (Accessed 27 July 2022).

Kandel, B. 2020. Qualitative versus quantitative research. *Journal of Product Innovation Management*, 32 (5): 658. Available: https://www.academia.edu/download/67682126/Qualitative_Vs_Quantitative_Research.pdf (Accessed 22 July 2022).

Kang, E. and Hwang, H.J. 2023. The importance of anonymity and confidentiality for conducting survey research. *Journal of Research and Publication Ethics*, 4(1): 1–7. Available: <https://koreascience.kr/article/JAKO202310240531197.page> (Accessed 19 November 2023).

Kara, H. and Pickering, L. 2017. New directions in qualitative research ethics. *International Journal of Social Research Methodology*, 20(3): 239–241. Available: <https://www.tandfonline.com/doi/full/10.1080/13645579.2017.1287869> (Accessed 22 July 2022).

Karabay, A., Akhmetova, S. and Durrani, N. 2024. Lessons learned from the experiences of domestic violence service providers in times of crisis: Insights from a central Asian country. *International Journal of Environmental Research and Public Health*, 21 (10): 1326. Available: <https://www.mdpi.com/1660-4601/21/10/1326> (Accessed 7 March 2025).

Karagiannis, G. M., Chondrogiannis, S., Krausmann, E. and Turksezer, Z. I. 2017. *Power grid recovery after natural hazard impact*. Luxembourg: Publications Office of the European Union. Available: <https://core.ac.uk/download/pdf/141667114.pdf> (Accessed 14 October 2024).

Karaye, I. M., Ross, A. D. and Horney, J. A. 2020. Self-rated mental and physical health of US Gulf Coast residents. *Journal of Community Health*, 45 (3): 598–605. Available: <https://link.springer.com/article/10.1007/s10900-019-00779-7> (Accessed 12 November 2022).

Karim, M. Z., Al-Mamun, M., Eva, M. A., Ali, M. H., Kalam, A., Uzzal, N. I. and Das, P. K. 2024. Understanding mental health challenges and associated risk factors of post-natural disasters in Bangladesh: A systematic review. *Frontiers in Psychology*, 15: 1466722. Available: <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1466722/full> (Accessed 8 May 2025).

Karunarathna, I., Gunasena, P., Hapuarachchi, T. and Gunathilake, S. 2024. The

crucial role of data collection in research: Techniques, challenges, and best practices. *Uva Clinical Research*, 1–24. Available: <https://www.scribd.com/document/803783341/Karunarathna-2024-TheCrucialRoleofDataCollectioninResearchTechniquesChallengesandBestPractices> (Accessed 19 December 2024).

Katerndahl, D. A. 2008. Impact of spiritual symptoms and their interactions on health services and life satisfaction. *The Annals of Family Medicine*, 6 (5): 412–420. Available: <https://pubmed.ncbi.nlm.nih.gov/18779545/> (Accessed (19 July 2022)).

Kato, T. 2021. Sharing experience by residents of past disaster sites: Effects of time from disasters and types of experience. *International Journal of Disaster Risk Reduction*, 61: 102390. Available: <https://www.sciencedirect.com/science/article/pii/S2212420921003514> (Accessed 29 June 2023).

Kaur, M., Hewage, K. and Sadiq, R. 2021. Integrated level of service index for buried water infrastructure: Selection and development of performance indicators. *Sustainable Cities and Society*, 68: 102799. Available: <https://www.sciencedirect.com/science/article/pii/S2210670721000913> (Accessed 12 June 2022).

Kawano, T., Nishiyama, K., Morita, H., Yamamura, O., Hiraide, A. and Hasegawa, K. 2016. Association between shelter crowding and incidence of sleep disturbance among disaster evacuees: A retrospective medical chart review study. *BMJ open*, 6 (1): e009711. Available: <https://pubmed.ncbi.nlm.nih.gov/26769785/> (Accessed 19 July 2022).

Kawasaki, A., Kawamura, G. and Zin, W. W. 2020. A local level relationship between floods and poverty: A case in Myanmar. *International Journal of Disaster Risk Reduction*, 42: 101348. Available: <https://www.sciencedirect.com/science/article/pii/S221242091930963X> (Accessed 27 August 2023).

Kayaga, S. M., Amankwaa, E. F., Gough, K. V., Wilby, R. L., Abarike, M. A., Codjoe, S. N., Kasei, R., Nabilse, C. K., Yankson, P. W. and Mensah, P. 2020. Cities and extreme weather events: Impacts of flooding and extreme heat on water and electricity services in Ghana. *Environment and Urbanization*, 33 (1): 131–150. Available: <https://journals.sagepub.com/doi/abs/10.1177/0956247820952030> (Accessed 27 July 2022).

Kaźmierczak, A. and Cavan, G. 2011. Surface water flooding risk to urban communities: Analysis of vulnerability, hazard and exposure. *Landscape and urban planning*, 103 (2): 185–197. Available: <https://www.sciencedirect.com/science/article/pii/S0169204611002404> (Accessed 9 October 2022).

Kelly, M., Mitchell, I., Walker, I., Mears, J. and Scholz, B. 2023. “I can’t make all this work.” End of life care provision in natural disasters: A qualitative study. *BMC Palliative Care*, 22 (1): 21. Available: <https://bmcpalliatcare.biomedcentral.com/articles/10.1186/s12904-023-01137-0> (Accessed 20 June 2023).

Kenyi, E. E. 2020. Public health impacts and responses to floods. *South Sudan Medical Journal*, 13 (1): 22–23. Available: <https://www.ajol.info/index.php/ssmj/article/view/203743/192160> (Accessed 7 June 2022).

Kessler, R. C., Galea, S., Gruber, M. J., Sampson, N. A., Ursano, R. J. and Wessely, S. 2008. Trends in mental illness and suicidality after Hurricane Katrina. *Molecular Psychiatry*, 13 (4): 374–384. Available: <https://www.nature.com/articles/4002119> (Accessed 11 March 2024).

Keya, T. A., Leela, A., Habib, N., Rashid, M., Bakthavatchalam, P. and Habib, N. 2023. Mental health disorders due to disaster exposure: a systematic review and meta-analysis. *Cureus*, 15 (4): e37031. Available:

<https://www.cureus.com/articles/138431-mental-health-disorders-due-to-disaster-exposure-a-systematic-review-and-meta-analysis.pdf> (Accessed 2 February 2024).

Khafagy, R. A. 2020. Faith-based organizations: humanitarian mission or religious missionary. *Journal of International Humanitarian Action*, 5 (1): 13. Available: <https://link.springer.com/article/10.1186/s41018-020-00080-6> (Accessed 12 April 2022).

Khalli, M. and Sharif, M. F. 2024. Masjid-based disaster management: How masjids in Malaysia support the needy. *Pertanika Journal of Social Sciences and Humanities*, 32: 29–46. Available: [http://www.pertanika.upm.edu.my/resources/files/Pertanika%20PAPERS/JSSH%20Vol.%2032%20\(S4\)%202024/02%20JSSH\(S\)-1564-2024.pdf](http://www.pertanika.upm.edu.my/resources/files/Pertanika%20PAPERS/JSSH%20Vol.%2032%20(S4)%202024/02%20JSSH(S)-1564-2024.pdf) (Accessed 19 September 2024).

Khan, S., Gabralla, A. and Ebrahim, A. 2013. South African Indian Muslim faith based organisations (FBOS) response to international disasters: Case study of the Gift of the Givers foundation. *Man in India*, 93 (4): 713-737. Available: https://serialsjournals.com/abstract/39636_14.pdf (Accessed 3 March 2023).

Khumalo, N. Z. and Sibanda, M. 2019. Does urban and peri-urban agriculture contribute to household food security? An assessment of the food security status of households in Tongaat, eThekweni Municipality. *Sustainability*, 11 (4): 1082. Available: <https://www.mdpi.com/2071-1050/11/4/1082> (Accessed 5 March 2023).

Kidd, S. A., Greco, S. and McKenzie, K. 2020. Global climate implications for homelessness: A scoping review. *Journal of Urban Health*, 98 (3): 385–393. Available: 10.1007/s11524-020-00483-1 (Accessed 12 November 2022).

Kikwasi, G. and Mbuya, E. 2019. Vulnerability analysis of building structures to floods: The case of flooding informal settlements in Dar es salaam, Tanzania. *International Journal of Building Pathology and Adaptation*, 37 (5): 629–656. Available: <https://www.emerald.com/insight/content/doi/10.1108/IJBPA-07-2018->

0056/full/html (Accessed 7 May 2023).

Kilungo, A., Chukwuonye, G. N., Okpanachi, V. and Hussein, M. 2024. Preparedness of Sub-Saharan African countries to address climate change and health impact: A Scoping Review. *MedRxiv*, 1-38. Available: <https://www.medrxiv.org/content/10.1101/2024.11.28.24318138v1.full> (Accessed 10 May 2025).

Kim, Y. and Lee, H. 2021. Sleep problems among disaster victims: a long-term survey on the life changes of disaster victims in Korea. *International Journal of Environmental Research and Public Health*, 18 (6): 3294. Available: <https://www.mdpi.com/1660-4601/18/6/3294> (Accessed 11 March 2024).

Kim, M., Kim, K. and Kim, E. 2021. Problems and implications of shelter planning focusing on habitability: A case study of a temporary disaster shelter after the Pohang earthquake in South Korea. *International Journal of Environmental Research and Public Health*, 18 (6): 2868. Available: <https://www.mdpi.com/1660-4601/18/6/2868> (Accessed 19 May 2023).

Kino, S., Aida, J., Kondo, K. and Kawachi, I. 2021. Persistent mental health impacts of disaster. Five-year follow-up after the 2011 great east Japan earthquake and tsunami: Iwanuma Study. *Journal of Psychiatric Research*, 136: 452–459. Available: <https://www.sciencedirect.com/science/article/pii/S0022395620309274> (Accessed 11 March 2024).

Kitamura, M. 2013. The Great East Japan Earthquake and COVID-19 through the lenses of gender and age. *Invisible Reconstruction*. Available: <https://discovery.ucl.ac.uk/id/eprint/10161484/1/Invisible-Reconstruction.pdf#page=224> (Accessed 24 March 2022).

Kitula, L. S. and Mhando, N. E. 2024. The impact of religious influence on humanitarianism: Evidence from local communities affected by floods in Kilosa, Tanzania. *Tanzanian Journal of Population Studies and Development*, 31 (1): 1–20.

Available: <https://www.ajol.info/index.php/tjpsd/article/view/285030> (Accessed 2 February 2025).

Kivunja, C. and Kuyini, A. B. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, 6 (5): 26–41. Available: <https://eric.ed.gov/?id=EJ1154775> (Accessed 19 September 2022).

Kivunja, C. 2018. Distinguishing between theory, theoretical framework, and conceptual framework: A systematic review of lessons from the field. *International Journal of Higher Education*, 7 (6): 44–53. Available: <https://eric.ed.gov/?id=EJ1198682> (Accessed 23 October 2023).

Kotani, H., Tamura, M., Li, J. and Yamaji, E. 2021. Potential of mosques to serve as evacuation shelters for foreign Muslims during disasters: A case study in Gunma, Japan. *Natural Hazards*, 109 (2): 1407–1423. Available: <https://link.springer.com/article/10.1007/s11069-021-04883-7> (Accessed 4 June 2022).

Kousky, C. 2016. Impacts of natural disasters on children. *The Future of Children*, 26(1): 73-92. Available: <https://www.jstor.org/stable/43755231> (Accessed 18 July 2022).

Kovats, S. and Akhtar, R. 2008. Climate, climate change and human health in Asian cities. *Environment and Urbanization*, 20 (1): 165–175. Available: <https://journals.sagepub.com/doi/abs/10.1177/0956247808089154> (Accessed 12 April 2022).

Krause, U. 2020. Violence against women in camps? Exploring links between refugee camp conditions and the prevalence of violence. In: Crepaz, K., Becker, U., Wacker, E. eds. *Health in Diversity – Diversity in Health*. Wiesbaden: Springer. Available: https://link.springer.com/chapter/10.1007/978-3-658-29177-8_11 (Accessed 19 July 2022).

Krichen, M., Abdalzaher, M. S., Elwekeil, M. and Fouda, M. M. 2024. Managing natural disasters: An analysis of technological advancements, opportunities, and challenges. *Internet of Things and Cyber-Physical Systems*, 4: 99–109. Available: <https://www.sciencedirect.com/science/article/pii/S2667345223000500> (Accessed 3 March 2025).

Krishna, R. N., Ronan, K. R. and Alisic, E. 2018. Children in the 2015 South Indian floods: Community members' views. *European Journal of Psychotraumatology*, 9 (sup2): 1486122. Available: <https://www.tandfonline.com/doi/abs/10.1080/20008198.2018.1486122> (Accessed 3 June 2022).

Kuran, C. H. A., Morsut, C., Kruke, B. I., Krüger, M., Segnestam, L., Orru, K., Nævestad, T. O., Airola, M., Keränen, J. and Gabel, F. 2020. Vulnerability and vulnerable groups from an intersectionality perspective. *International Journal of Disaster Risk Reduction*, 50: 101826. Available: <https://www.sciencedirect.com/science/article/pii/S2212420920313285> (Accessed 24 May 2022).

KwaZulu Natal, Department of Human Settlements. 2022. *Priority remains to move flood victims from public facilities to decent homes*. Available: <https://www.kzndhs.gov.za/images/2022MR/09%20May%202022%20-%20Progress%20on%20rehabilitation%20of%20families%20affected%20by%20the%20April%202022%20floods.pdf> (Accessed 7 August 2022).

KwaZulu-Natal, Department of Cooperative Governance and Traditional Affairs. 2018. *Ethekwini metropolitan municipal profile*. Available: <https://www.kzncogta.gov.za/wp-content/uploads/2018/01/eThekwini-District-Profile-Dec-2017.pdf> (Accessed 19 June 2022).

KwaZulu-Natal, Department of Human Settlements. 2023. *KZN Human settlements disaster management policies*. Available: https://www.kzndhs.gov.za/images/documents/Provincial%20Policies/KZN_Human_

Settlements_Disaster_Management_Policy.pdf (Accessed 2 March 2024).

Lai, B. S., La Greca, A. M., Colgan, C. A., Herge, W., Chan, S., Medzhitova, J., Short, M. and Auslander, B. 2020. Sleep problems and posttraumatic stress: Children exposed to a natural disaster. *Journal of Pediatric Psychology*, 45 (9): 1016–1026. Available: <https://academic.oup.com/jpepsy/article-abstract/45/9/1016/5901333> (Accessed 9 July 2022).

Lalani, N., Drolet, J. L., McDonald-Harker, C., Brown, M. R., Brett-MacLean, P., Agyapong, V. I., Greenshaw, A. J. and Silverstone, P. H. 2021. Nurturing spiritual resilience to promote post-disaster community recovery: The 2016 Alberta Wildfire in Canada. *Frontiers in Public Health*, 9: 682558. Available: <https://www.frontiersin.org/articles/10.3389/fpubh.2021.682558/full> (Accessed 4 April 2024).

Lamond, J. E., Joseph, R. D. and Proverbs, D. G. 2015. An exploration of factors affecting the long term psychological impact and deterioration of mental health in flooded households. *Environmental research*, 140: 325–334. Available: <https://www.sciencedirect.com/science/article/pii/S0013935115001255> (Accessed 19 May 2022).

Landaverde, E., G  n  reux, M., Maltais, D. and Gachon, P. 2022. Respiratory and otolaryngology symptoms following the 2019 spring floods in Quebec. *International Journal of Environmental Research and Public Health*, 19 (18): 11738. Available: <https://www.mdpi.com/1660-4601/19/18/11738> (Accessed 12 June 2024).

Langmann, E. 2023. Vulnerability, ageism, and health: is it helpful to label older adults as a vulnerable group in health care? *Medicine, Health Care and Philosophy*, 26 (1): 133–142. Available: <https://link.springer.com/article/10.1007/s11019-022-10129-5> (Accessed 12 February 2024).

Lara-Valencia, F., Garc  a-P  rez, H. and Zuniga-Teran, A. 2024. Crossed by the border: children’s lived experiences with flooding in an urbanized transborder

watershed. *Children's Geographies*, 22 (6): 844–859. Available: <https://www.tandfonline.com/doi/abs/10.1080/14733285.2024.2397733> (Accessed 6 February 2025).

Lee, J., Perera, D., Glickman, T. and Taing, L. 2020. Water-related disasters and their health impacts: A global review. *Progress in Disaster Science*, 8: 100123. Available: <https://www.sciencedirect.com/science/article/pii/S2590061720300600> (Accessed 24 November 2024).

Lehman, B. J., David, D. M. and Gruber, J. A. 2017. Rethinking the biopsychosocial model of health: Understanding health as a dynamic system. *Social and Personality Psychology Compass*, 11 (8): e12328. Available: <https://compass.onlinelibrary.wiley.com/doi/abs/10.1111/spc3.12328> (Accessed 16 November 2023).

Leichenko, R. and Silva, J. A. 2014. Climate change and poverty: vulnerability, impacts, and alleviation strategies. *Wiley Interdisciplinary Reviews: Climate Change*, 5 (4): 539–556. Available: <https://wires.onlinelibrary.wiley.com/doi/abs/10.1002/wcc.287> (Accessed 20 May 2022).

Leite, D. F., Padilha, M. A. S. and Cecatti, J. G. 2019. Approaching literature review for academic purposes: The Literature Review Checklist. *Clinics*, 74: e1403. Available: <https://www.scielo.br/j/clin/a/9SHrNZzgy9kWxvBG5rxBGpq/?format=html> (Accessed 12 May 2022).

Leppold, C., Gibbs, L., Block, K., Reifels, L. and Quinn, P. 2022. Public health implications of multiple disaster exposures. *The Lancet Public Health*, 7 (3): e274–e286. Available: <https://etheses.whiterose.ac.uk/23962/> (Accessed 15 August 2022).

Letsatsi, N. and Kruger, A. 2022. The April 2022 floods in comparison with other recent flooding events in KwaZulu-Natal. *WeatherSmart*. Available: <https://www.researchgate.net/profile/Nthabiseng->

Letsatsi/publication/386352236_Scientific_meteorological_and_climatological_news_from_the_South_African_Weather_Service_NEWS/links/674eae77359dcb4d9d4ee828/Scientific-meteorological-and-climatological-news-from-the-South-African-Weather-Service-NEWS.pdf#page=5 (Accessed 2 October 2023).

Li, A., Toll, M., Martino, E., Wiesel, I., Botha, F. and Bentley, R. 2023. Vulnerability and recovery: Long-term mental and physical health trajectories following climate-related disasters. *Social Science and Medicine*, 320: 115681. Available: <https://www.sciencedirect.com/science/article/pii/S0277953623000369> (Accessed 14 March 2024).

Liang, S. Y. and Messenger, N. 2018. Infectious diseases after hydrologic disasters. *Emergency Medical Clinics*, 36 (4): 835–851. Available: <https://pubmed.ncbi.nlm.nih.gov/30297008/> (Accessed 23 November 2022).

Liebenberg, L., Jamal, A. and Ikeda, J. 2020. Extending youth voices in a participatory thematic analysis approach. *International Journal of Qualitative Methods*, 19: 1-13. Available: <https://journals.sagepub.com/doi/abs/10.1177/1609406920934614> (Accessed 30 May 2022).

Lim, W. M. 2025. What is qualitative research? An overview and guidelines. *Australasian Marketing Journal*, 33 (2): 199–229. Available: <https://journals.sagepub.com/doi/abs/10.1177/14413582241264619> (Accessed 3 February 2025).

Lindersson, S., Raffetti, E., Rusca, M., Brandimarte, L., Mård, J. and Di Baldassarre, G. 2023. The wider the gap between rich and poor the higher the flood mortality. *Nature Sustainability*, 6 (8): 995–1005. Available: <https://www.nature.com/articles/s41893-023-01107-7> (Accessed 12 March 2024).

Liu, Q., Du, M., Wang, Y., Deng, J., Yan, W., Qin, C., Liu, M. and Liu, J. 2024. Global, regional and national trends and impacts of natural floods, 1990–2022.

Bulletin of the World Health Organization, 102 (6): 410. Available:
<https://pmc.ncbi.nlm.nih.gov/articles/PMC11132161/> (Accessed 8 December 2024).

Lowe, S. R., McGrath, J. A., Young, M. N., Kwok, R. K., Engel, L. S., Galea, S. and Sandler, D. P. 2019. Cumulative disaster exposure and mental and physical health symptoms among a large sample of Gulf Coast residents. *Journal of Traumatic Stress*, 32 (2): 196–205. Available:
<https://onlinelibrary.wiley.com/doi/abs/10.1002/jts.22392> (Accessed 14 June 2023).

Lu, X., Chan, F. K. S., Chan, H. K. and Chen, W.Q. 2024. Mitigating flood impacts on road infrastructure and transportation by using multiple information sources. *Resources, Conservation and Recycling*, 206: 107607. Available:
<https://www.sciencedirect.com/science/article/pii/S0921344924002015> (Accessed 8 May 2025).

Luft, J. A., Jeong, S., Idsardi, R. and Gardner, G. 2022. Literature reviews, theoretical frameworks, and conceptual frameworks: An introduction for new biology education researchers. *CBE—Life Sciences Education*, 21 (3): 1-10. Available:
<https://www.lifescied.org/doi/abs/10.1187/cbe.21-05-0134> (Accessed 1 March 2023).

Macpherson, R. I. and Burkle, F. M. 2020. Humanitarian aid workers: The forgotten first responders. *Prehospital and Disaster Medicine*, 36 (1): 111–114. Available:
<https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine/article/humanitarian-aid-workers-the-forgotten-first-responders/F7FA565F992B610CB51B96347205F09C> (Accessed 14 June 2023).

Madubula, N. and van Eeden, E. 2024. An analysis of the vulnerability of informal and formal households to disaster risks in the Rand West City region. *Jàmbá-Journal of Disaster Risk Studies*, 16 (1): 1589. Available:
<https://journals.co.za/doi/abs/10.4102/jamba.v16i1.1589> (Accessed 7 February 2025).

Maguire, M. and Delahunt, B. 2017. Doing a thematic analysis: A practical, step-by-

step guide for learning and teaching scholars. *All Ireland Journal of Higher Education*, 9 (3). Available: <http://ojs.aishe.org/index.php/aishe-j/article/view/335> (Accessed 22 July 2023).

Majid, U. 2018. Research fundamentals: Study design, population, and sample size. *Undergraduate Research in Natural and Clinical Science and Technology Journal*, 2: 1–7. Available: <http://www.urncst.com/index.php/urncst/article/view/16> (Accessed 18 June 2022).

Makhaye, C. *KZN floods: 'My wife called, telling me to return quickly because muddy water had seeped through our house'*. 2022. *Daily Maverick*. Available: <https://www.dailymaverick.co.za/article/2022-04-18-kzn-floods-my-wife-called-telling-me-to-return-muddy-water-seeped-through-house/> (Accessed 19 November 2022).

Makoha, G. and Denov, M. 2024. War, forced displacement, and alcohol abuse: experiences and perceptions of war-affected South Sudanese refugee youth living in Bidibidi refugee settlement in northern Uganda. *Frontiers in Public Health*, 12: 1232504. Available: <https://www.frontiersin.org/articles/10.3389/fpubh.2024.1232504/full> (Accessed 14 May 2024).

Makoni, M. 2021. Social unrest disrupts South African health care. *Lancet (London, England)*, 398 (10297): 287. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8482060/> (Accessed 12 September 2022).

Makwana, N. 2019. Disaster and its impact on mental health: A narrative review. *Journal of Family Medicine and Primary Care*, 8 (10): 3090–3095. Available: https://journals.lww.com/jfmpc/fulltext/2019/08100/disaster_and_its_impact_on_mental_health__a.4.aspx (Accessed 24 July 2024).

Maldeniya, D., De Choudhury, M., Garcia, D. and Romero, D. M. 2023. Pulling through together: Social media response trajectories in disaster-stricken communities. *Journal of Computational Social Science*, 6 (2): 655–706. Available:

<https://link.springer.com/article/10.1007/s42001-023-00209-8> (Accessed 8 March 2024).

Malmqvist, J., Hellberg, K., Möllås, G., Rose, R. and Shevlin, M. 2019. Conducting the pilot study: A neglected part of the research process? Methodological findings supporting the importance of piloting in qualitative research studies. *International Journal of Qualitative Methods*, 18. Available: <https://journals.sagepub.com/doi/abs/10.1177/1609406919878341> (Accessed 8 May 2022).

Maltz, M. 2019. Caught in the eye of the storm: the disproportionate impact of natural disasters on the elderly population in the United States. *The Elder Law Journal*, 27: 157. Available: https://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/elder27§ion=9 (Accessed 31 March 2024).

Maluleke, T. 2022. *Auditor-general reports response to KwaZulu-Natal and Eastern Cape flood disaster as too slow*. Available: <https://www.agsa.co.za/Portals/0/Reports/Special%20Reports/RealTime/Media%20Statement%20-%20First%20special%20report%20on%202022%20real-time%20audit%20on%20flood%20relief%20funds%20-%2031%20August%202022%20FINAL.pdf?ver=2022-08-31-103740-440> (Accessed 4 October 2022).

Mann, S. K., Marwaha, R. and Torrico, T. J. 2024. *Posttraumatic Stress Disorder* Treasure Island (FL): StatPearls Publishing. Available: <https://www.ncbi.nlm.nih.gov/books/NBK559129/> (Accessed 2 March 2025).

Manning, L., Ferris, M., Narvaez Rosario, C., Prues, M. and Bouchard, L. 2018. Spiritual resilience: Understanding the protection and promotion of well-being in the later life. *Journal of Religion, Spirituality & Aging*, 31 (2): 168–186. Available: <https://www.tandfonline.com/doi/abs/10.1080/15528030.2018.1532859> (Accessed 2 October 2023).

Mansoor, N., Anuar, A. N., Mahdzir, A. M. and Adnan, N. H.M. 2023. Enhancing disaster resilience: Overview of resilient housing. *Social Sciences*, 13 (9): 261–275. Available: https://www.researchgate.net/profile/Nurin-Mansoor/publication/373946256_Enhancing_Disaster_Resilience_Overview_of_Resilient_Housing/links/650466269fdf0c69dfcde1f7/Enhancing-Disaster-Resilience-Overview-of-Resilient-Housing.pdf (Accessed 6 February 2024).

Mansour, K. and Ezzat, H. R. 2009. *Faith-based action in development and humanitarian work*. London: SAGE Publications Ltd. Available: <https://sk.sagepub.com/book/edvol/embed/global-civil-society-yearbook-2009/chpt/faithbased-action-development-humanitarian-work> (Accessed 8 April 2022).

Mao, X., Fung, O. W. M., Hu, X. and Loke, A. Y. 2018. Psychological impacts of disaster on rescue workers: A review of the literature. *International Journal of Disaster Risk Reduction*, 27: 602–617. Available: <https://www.sciencedirect.com/science/article/pii/S2212420917303187> (Accessed 3 April 2025).

Maripe, K. and Rankopo, M. 2018. Community vulnerability in climate disaster and environmental sustainability: A Botswana Perspective. *Current Journal of Applied Science and Technology*, 26 (3): 1–14. Available: <https://www.academia.edu/download/69501816/MjM3MTJAQHBm.pdf> (Accessed 26 May 2022).

Marutlulle, N. K. 2022. A critical analysis of housing inadequacy in South Africa and its ramifications. *Africa's Public Service Delivery and Performance Review*, 9 (1): 372. Available: <https://journals.co.za/doi/abs/10.4102/apspdpr.v9i1.372> (Accessed 30 March 2025).

Marvi, M. 2020. A review of flood damage analysis for a building structure and contents. *Natural Hazards*, 102. Available: <https://link.springer.com/article/10.1007/s11069-020-03941-w> (Accessed 19 May 2025).

2022).

Masese, A., Neyole, E. and Ombachi, N. 2016. Loss and damage from flooding in lower Nyando Basin, Kisumu County, Kenya. *International Journal of Social Science and Humanities Research*, 4 (3): 9–22. Available: https://www.researchgate.net/profile/Edward-Neyole/publication/308631798_Loss_and_Damage_from_Flooding_In_Lower_Nyando_Basin_Kisumu_County_Kenya/links/57e93e0908ae113df5206912/Loss-and-Damage-from-Flooding-In-Lower-Nyando-Basin-Kisumu-County-Kenya.pdf (Accessed 12 March 2023).

Mashego, R. 2022. *KZN floods: DWS on current interventions, findings and actions taken; with Deputy Minister*. Available: <https://pmg.org.za/committee-meeting/35342/> (Accessed 4 October 2022).

Massey, E., Smith, J. and Roberts, B. 2017. Health needs of older populations affected by humanitarian crises in low-and middle-income countries: A systematic review. *Conflict and health*, 11: 1–21. Available: <https://link.springer.com/article/10.1186/s13031-017-0133-x> (Accessed 12 March 2024).

Masudin, I. and Fernanda, F. 2019. A review of literature on types, stages of recovery and humanitarian logistics operations in the tsunami and earthquake disaster in Indonesia. In: *Proceedings of IOP conference series: materials science and engineering*. IOP Publishing, 012043. Available: <https://iopscience.iop.org/article/10.1088/1757-899X/674/1/012043/meta> (Accessed 9 June 2022).

Math, S. B., Nirmala, M. C., Moirangthem, S. and Kumar, N. C. 2015. Disaster management: mental health perspective. *Indian Journal of Psychological Medicine*, 37 (3): 261–271. Available: <https://journals.sagepub.com/doi/abs/10.4103/0253-7176.162915> (Accessed 7 May 2022).

Mathew, G., Varghese, A. D., Sabu, A. M. and Joseph, A. 2021a. Screening for post-traumatic stress disorder among adolescents following floods-a comparative study from private and public schools in Kerala, India. *BMC pediatrics*, 21: 1–7. Available: <https://link.springer.com/article/10.1186/s12887-021-02933-4> (Accessed 2 June 2022).

Mathew, T. H., Louis, N. and Mabila, T. E. 2021b. Review of Disaster Response Strategies for Sustainable Development in the Wake of Flood Risks in Zimbabwe's Rural-Urban Settlements. *Technium Social Sciences Journal*, 26: 968. Available: https://www.researchgate.net/publication/357337950_Review_of_disaster_response_strategies_for_sustainable_development_in_the_wake_of_flood_risks_in_Zimbabwe's_rural-urban_settlements (Accessed 6 July 2022).

Matlakala, F. K., Makhubele, J. C. and Nyahunda, L. 2022. Social workers' intervention during natural hazards. *Jàmbá-Journal of Disaster Risk Studies*, 14 (1): 1176. Available: <https://journals.co.za/doi/abs/10.4102/jamba.v14i1.1176> (Accessed 2 February 2023).

Matlakala, F. K., Rantho, K. M. and Mapaling, C. 2024. Vulnerability of elderly people during climate-induced disasters in sub-Saharan Africa: A scoping review. *Frontiers in Human Dynamics*, 6: 1430667. Available: <https://www.frontiersin.org/journals/human-dynamics/articles/10.3389/fhumd.2024.1430667/full> (Accessed 12 February 2025).

Matsuoka, Y., Haseda, M., Kanamori, M., Sato, K., Amemiya, A., Ojima, T., Takagi, D., Hanazato, M. and Kondo, N. 2023. Does disaster-related relocation impact mental health via changes in group participation among older adults? Causal mediation analysis of a pre-post disaster study of the 2016 Kumamoto earthquake. *BMC public health*, 23 (1): 1982. Available: <https://link.springer.com/article/10.1186/s12889-023-16877-0> (Accessed 8 March 2024).

Matthews, V., Longman, J., Berry, H. L., Passey, M., Bennett-Levy, J., Morgan, G. G., Pit, S., Rolfe, M. and Bailie, R. S. 2019. Differential mental health impact six

months after extensive river flooding in rural Australia: A cross-sectional analysis through an equity lens. *Frontiers in public health*, 7: 367. Available: <https://www.frontiersin.org/articles/10.3389/fpubh.2019.00367/full> (Accessed 25 August 2022).

Mavhura, E. 2019. Analysing drivers of vulnerability to flooding: a systems approach. *South African Geographical Journal= Suid-Afrikaanse Geografiese Tydskrif*, 101 (1): 72–90. Available: <https://journals.co.za/doi/abs/10.1080/03736245.2018.1541020> (Accessed 8 August 2022).

Mavhura, E. and Aryal, K.R. 2022. An adaptation of a macroscale methodology to assess the direct economic losses caused by Tropical Cyclone Idai in Zimbabwe. *Jàmbá-Journal of Disaster Risk Studies*, 14(1): 1276. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC9575376/> (Accessed 29 July 2023).

Mavrouli, M., Mavroulis, S., Lekkas, E. and Tsakris, A. 2021. Respiratory infections following earthquake-induced tsunamis: transmission risk factors and lessons learned for disaster risk management. *International Journal of Environmental Research and Public Health*, 18 (9): 4952. Available: <https://www.mdpi.com/1660-4601/18/9/4952> (Accessed 2 February 2024).

Mayalo, M. 2022. LOOK: Ministers to the front as flood effort in KZN stutters. *IOL*. Available: <https://iol.co.za/news/politics/2022-04-19-look-ministers-to-the-front-as-flood-effort-in-kzn-stutters/> (Accessed 2 August 2022).

Mazhar, S. A., Anjum, R., Anwar, A. I. and Khan, A. A. 2021. Methods of data collection: A fundamental tool of research. *Journal of Integrated Community Health*, 10 (1): 6–10. Available: https://www.researchgate.net/profile/Syeda-Ayeman-Mazhar/publication/356269289_Methods_of_Data_Collection_A_Fundamental_Tool_of_Research/links/61fe7e23870587329e943cd1/Methods-of-Data-Collection-A-Fundamental-Tool-of-Research.pdf (Accessed 19 July 2022).

Mazraeh, N., Khodarahimi, S., Hesam, M., Rasti, A., Khodarahmi, S., Aganj, N. and

Sheikhi, S. 2023. The role of social interest and empathy on helping behaviors during floods. *Anales de Psicología*, 39: 119–126. Available: <https://scielo.isciii.es/pdf/ap/v39n1/1695-2294-ap-39-01-119.pdf> (Accessed 16 December 2024).

McCann, D. G. 2011. A review of hurricane disaster planning for the elderly. *World Medical & Health Policy*, 3 (1): 1–26. Available: <https://onlinelibrary.wiley.com/doi/abs/10.2202/1948-4682.1144> (Accessed 21 January 2023).

McDermott, B. M. and Cobham, V. E. 2012. Family functioning in the aftermath of a natural disaster. *BMC psychiatry*, 12: 1–7. Available: <https://link.springer.com/article/10.1186/1471-244X-12-55> (Accessed 9 September 2022).

McGeehan, K. M. and Baker, C. K. 2017. Religious narratives and their implications for disaster risk reduction. *Disasters*, 41 (2): 258–281. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1111/disa.12200> (Accessed 20 July 2022).

McGuire, A. P., Gauthier, J. M., Anderson, L. M., Hollingsworth, D. W., Tracy, M., Galea, S. and Coffey, S. F. 2018. Social support moderates effects of natural disaster exposure on depression and posttraumatic stress disorder symptoms: Effects for displaced and nondisplaced residents. *Journal of traumatic stress*, 31 (2): 223–233. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/jts.22270> (Accessed 22 May 2022).

McInerney, S. 2002. Introducing the biopsychosocial model for good medicine and good doctors. *BMJ*, 324 (7353): 324. Available: <https://www.bmj.com/rapid-response/2011/10/29/introducing-biopsychosocial-model-good-medicine-and-good-doctors> (Accessed 3 March 2022).

McLean, C., Ground, L., Boon, R., Roberts, D., Govender, N., McInnes, A., Botes, W., Allan, D. and Ivins, J. 2016. *Durban's systematic conservation assessment*. Available: <https://www.researchgate.net/profile/Alistair->

Mcinnes/publication/308514781_Durban's_Systematic_Conservation_Plan/links/57e546f508ae8f5011eafaff/Durbans-Systematic-Conservation-Plan.pdf (Accessed 12 July 2022).

McLeod, S. 2025. *Qualitative vs Quantitative Research: What's the Difference?* Available: <https://www.simplypsychology.org/qualitative-quantitative.html> (Accessed 2 June 2025).

Mehring, P., Geoghegan, H., Cloke, H. and Clark, J. 2023. The F word: the experiential construction of flooding in England. *Emotion, Space and Society*, 48: 100966. Available: <https://www.sciencedirect.com/science/article/pii/S1755458623000294> (Accessed 28 January 2025).

Mehta, P., Zimba, O., Gasparian, A. Y., Seil, B. and Yessirkepov, M. 2023. Ethics committees: structure, roles, and issues. *Journal of Korean Medical Science*, 38 (25). Available: <https://synapse.koreamed.org/articles/1516082954> (Accessed 12 December 2023).

Meltzer, G. Y., Merdjanoff, A. A., Xu, S., Gershon, R., Emrich, C. T. and Abramson, D. M. 2023. Examining the effects of cumulative environmental stressors on Gulf Coast child and adolescent health. *Population and Environment*, 45 (3): 21. Available: <https://link.springer.com/article/10.1007/s11111-023-00436-1> (Accessed 12 December 2023).

Meltzer, G. Y., Zachery, M., Merdjanoff, A. A., Do, M. P., Pham, N. K. and Abramson, D. M. 2021. The effects of cumulative natural disaster exposure on adolescent psychological distress. *The Journal of Applied Research on Children: Informing Policy for Children at Risk*, 12 (1): 6. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC9898883/> (Accessed 18 May 2022).

Memon, F. S. 2020. Climate change and violence against women: study of a flood-affected population in the rural area of Sindh, Pakistan. *Pakistan Journal of Women's*

Studies Alam-e-Niswan, 27 (1): 65–85. Available: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3650270 (Accessed 26 March 2025).

Mendis, K., Thayaparan, M., Kaluarachchi, Y. and Pathirage, C. 2023. Challenges faced by marginalized communities in a post-disaster context: a systematic review of the literature. *Sustainability*, 15 (14): 10754. Available: <https://www.mdpi.com/2071-1050/15/14/10754> (Accessed 12 June 2024).

Mensah, H. and Ahadzie, D. K. 2020. Causes, impacts and coping strategies of floods in Ghana: a systematic review. *SN Applied Sciences*, 2: 1–13. Available: <https://link.springer.com/article/10.1007/s42452-020-2548-z> (Accessed 12 June 2022).

Metelerkamp, T. 2022. Donations stream in for Gift of the Givers' KZN water collection drive. *Daily Maverick*, 27 April 2022. Available: <https://www.dailymaverick.co.za/article/2022-04-27-donations-stream-in-for-gift-of-the-givers-kzn-water-collection-drive/> (Accessed 9 August 2022).

Mhlanga, C., Muzingili, T. and Mpambela, M. 2019. Natural disasters in Zimbabwe: The primer for social work intervention. *African Journal of Social Work*, 9 (1). Available: <https://www.ajol.info/index.php/ajsw/article/view/184232> (Accessed 19 October 2022).

Mikutta, C., Schmid, J. J. and Ehler, U. 2022. Resilience and post-traumatic stress disorder in the Swiss Alpine Rescue Association. *Frontiers in Psychiatry*, 13: 780498. Available: <https://www.frontiersin.org/articles/10.3389/fpsyt.2022.780498/full> (Accessed 14 October 2024).

Miles, E. 2020. Biopsychosocial Model. In: Gellman, M.D. and Turner, J.R. eds. *Encyclopedia of Behavioral Medicine*. New York: Springer. Available: http://link.springer.com/10.1007/978-3-030-39903-0_1095 (Accessed 15 July 2022).

Miles, R. 2015. Complexity, representation and practice: Case study as method and methodology. *Issues in Educational Research*, 25 (3): 309–318. Available: <https://www.iier.org.au/iier25/miles.pdf> (Accessed 18 July 2022).

Mirza, H., Mirza, C. and Bellalem, F. 2023. Ethical considerations in qualitative research: Summary guidelines for novice social science researchers. *Social Studies and Research Journal*, 11 (1): 441–449. Available: <https://asjp.cerist.dz/en/article/220704> (Accessed 2 March 2024).

Mishra, S. and Mazumdar, S. 2014. Psychology of disaster preparedness. *Ecopsychology*, 7 (4): 211–223. Available: https://www.researchgate.net/publication/289533511_Psychology_of_Disaster_Preparedness (Accessed 5 May 2022).

Misra, S., Goswami, R., Mondal, T. and Jana, R. 2017. Social networks in the context of community response to disaster: Study of a cyclone-affected community in Coastal West Bengal, India. *International Journal of Disaster Risk Reduction*, 22: 281–296. Available: <https://www.sciencedirect.com/science/article/pii/S2212420916304332> (Accessed 9 April 2024).

Mizutori, M. 2022. *From Risk to Resilience: Summary of the 2022 Global Platform for Disaster Risk Reduction*. Available: <https://www.gidrm.net/en/news/from-risk-to-resilience-summary-of-this-years-global-platform-for-disaster-risk-reduction> (Accessed 19 July 2025).

Mkhize, X., Mthembu, B. E. and Napier, C. 2023. Transforming a local food system to address food and nutrition insecurity in an urban informal settlement area: A study in Umlazi Township in Durban, South Africa. *Journal of Agriculture and Food Research*, 12: 100565. Available: <https://www.sciencedirect.com/science/article/pii/S2666154323000728> (Accessed 5 February 2024).

Mkhwanazi, N. and Guy, D. 2022. Flood flashback hell. *IOL*. Available: <https://iol.co.za/ios/news/2022-05-14-flood-flashback-hell/> (Accessed 2 February 2023).

Mohajan, H. K. 2020. Quantitative research: A successful investigation in natural and social sciences. *Journal of Economic Development, Environment and People*, 9 (4): 50–79. Available: <https://www.ceeol.com/search/article-detail?id=939590> (Accessed 4 July 2022).

Mohd, T., Mohamed Saraf, M., Che Pin, S. F., Hasbullah, M. N., Nordin, T. and Ismail, D. 2016. The degree of housing damage model for a flood affected area. *MATEC Web of Conferences*, 66: 00074. Available: https://www.researchgate.net/publication/305309729_The_degree_of_housing_damage_model_for_a_flood_affected_area (Accessed 19 July 2022).

Mokhtari, M., Faridi, P., Masoodi, M. and Ahmadi, S. M. 2023. *Perspective chapter: A global view of natural hazards related disasters*. London: IntechOpen. Available: <https://www.intechopen.com/chapters/87034> (Accessed 25 January 2024).

Mora, C., Spirandelli, D., Franklin, E. C., Lynham, J., Kantar, M. B., Miles, W., Smith, C. Z., Freel, K., Moy, J. and Louis, L. V. 2018. Broad threat to humanity from cumulative climate hazards intensified by greenhouse gas emissions. *Nature climate change*, 8 (12): 1062–1071. Available: <https://www.nature.com/articles/s41558-018-0315-6> (Accessed 27 June 2022).

Moreno, J. 2018. The role of communities in coping with natural disasters: Lessons from the 2010 Chile Earthquake and Tsunami. *Procedia engineering*, 212: 1040–1045. Available: <https://www.sciencedirect.com/science/article/pii/S1877705818301589> (Accessed 30 October 2024).

Morgan Brett, B. R. and Wheeler, K. 2021. *How to Do Qualitative Interviewing*. London: SAGE Publications Ltd. Available: <https://digital.casalini.it/9781529736625>

(Accessed 19 February 2023).

Moshtari, M., Altay, N., Heikkilä, J. and Gonçalves, P. 2021. Procurement in humanitarian organizations: Body of knowledge and practitioner's challenges. *International Journal of Production Economics*, 233: 108017. Available: <https://www.sciencedirect.com/science/article/pii/S0925527320303662> (Accessed 30 November 2022).

Moslehi, S., Dehghani, A., Masoumi, G., Sheikhi, R. A. and Barghi Shirazi, F. 2023. The role of the mosque as an emergency shelter in disasters: A systematic review. *Health in Emergencies and Disasters Quarterly*, 8: 223–232. Available: https://hdq.uswr.ac.ir/browse.php?a_id=402&slc_lang=en&sid=1&ftxt=1&html=1 (Accessed 19 June 2024).

Motswapong, E. P. 2022. *Hinduism and climate change in Africa*. London: Routledge. Available: <https://library.oapen.org/bitstream/handle/20.500.12657/54326/9781000587586.pdf?sequence=1#page=173> (Accessed 14 October 2023).

Mottiar, S. 2024. Electricity contestations and infrastructural citizenship: Protest in Lamontville, Durban1. In: Chikane, R. and Mottiar, S. eds. *Protest in South Africa: Rejection, reassertion, reclamation*. Johannesburg: Heidi Books. Available: https://books.google.com/books?hl=en&lr=&id=NDX6EAAQBAJ&oi=fnd&pg=PA192&dq=Electricity+contestations+and+infrastructural+citizenship:+Protest+in+Lamontville,+Durban1&ots=Z-B75sZU-l&sig=FEQ2sdK-7vz058_naYOB-MExX8Y (Accessed 9 November 2024).

Mpontshane, L. and Holtzhausen, N. 2024. Ethical leadership in promoting efficient service delivery: Evidence from eThekweni Municipality, KwaZulu-Natal. *Journal of Public Administration*, 59 (3): 349–363. Available: <https://journals.co.za/doi/abs/10.53973/jopa.2024.59.3.a2> (Accessed 14 December 2024).

Msasa, C. M. and Manda, M. A. C. 2025. Physical vulnerability of buildings to flooding in Lilongwe City, Malawi. *UCL Open Environment*, 7: e3216. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC12207978/> (Accessed 2 June 2025).

Medecins Sans Frontieres. 2022. *Thousands with difficult access to water after KwaZulu-Natal's devastating flash floods*. Available: <https://www.msf.org.za/news-and-resources/press-release/difficult-access-water-kwazulu-natal-flash-floods> (Accessed 13 May 2022).

Mthiyane, D. B., Wissink, H. and Chiwawa, N. 2022. The impact of rural–urban migration in South Africa: A case of KwaDukuza municipality. *Journal of Local Government Research and Innovation*, 3: 56. Available: <https://journals.co.za/doi/abs/10.4102/jolgri.v3i0.56> (Accessed 12 January 2024).

Mudavanhu, C. 2014. The impact of flood disasters on child education in Muzarabani District, Zimbabwe. *Jàmbá: Journal of Disaster Risk Studies*, 6 (1): 8. Available: <http://jamba.org.za/index.php/jamba/article/view/138> (Accessed 19 July 2022).

Mudefi, E. 2023. Disaster management 'deeds' in the context of April 2022 KwaZulu-Natal floods: A scoping review. *International Journal of Disaster Risk Reduction*, 98: 104122. Available: <https://www.sciencedirect.com/science/article/pii/S2212420923006027> (Accessed 17 November 2024).

Mugabe, V. A., Gudo, E. S., Inlamea, O. F., Kitron, U. and Ribeiro, G. S. 2021. Natural disasters, population displacement and health emergencies: Multiple public health threats in Mozambique. *BMJ Global Health*, 6 (9): e006778. Available: <https://gh.bmj.com/content/6/9/e006778.abstract> (Accessed 7 May 2025).

Mugambiwa, S. and Makhubele, J. 2021. Anthropogenic flash floods and climate change in rural Zimbabwe: Impacts and options for adaptation. *Technium Social Sciences Journal*, 21: 809. Available: https://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/techssj21§ion=69 (Accessed 20 May

2022).

Muhambe, C., Ncube, A. and Bahta, Y. T. 2024. Dissemination and participation in early warnings and disaster risk reduction in South Africa. *Jàmbá-Journal of Disaster Risk Studies*, 16 (1): 1566. Available: <https://journals.co.za/doi/abs/10.4102/jamba.v16i1.1566> (Accessed 17 December 2024).

Müller, L., Rapoport, O. and Rahe, M. 2024. Mindfulness meditation improves mental health in flood survivors and disaster volunteers: A Randomized Wait-List Controlled Trial. *Mindfulness*, 15: 2750-2764. Available: <https://link.springer.com/article/10.1007/s12671-024-02467-7> (Accessed 2 January 2025).

Munro, A., Kovats, R. S., Rubin, G. J., Waite, T. D., Bone, A., Armstrong, B., Beck, C. R., Amlôt, R., Leonardi, G. and Oliver, I. 2017. Effect of evacuation and displacement on the association between flooding and mental health outcomes: A cross-sectional analysis of UK survey data. *The Lancet Planetary Health*, 1 (4): e134–e141. Available: [https://www.thelancet.com/journals/lancet/article/PIIS2542-5196\(17\)30047-5/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS2542-5196(17)30047-5/fulltext) (Accessed 3 March 2022).

Munsaka, E. and Mutasa, S. 2021. *Flooding and its impact on education*. London: IntechOpen. Available: https://books.google.com/books?hl=en&lr=&id=_TpbEAAQBAJ&oi=fnd&pg=PA151&ots=3zreS35Sa8&sig=ml_W2E-2OGXxthCmuFUWeqCIJnE (Accessed 12 January 2023).

Munteanu, A. M., Pistol, A., Guja, L., Carniciu, S., Popescu-Spineni, D. and Moldoveanu, A. M. 2018. Internally displaced persons and health effects caused by the floods that affected Romania during 2006-2007. *Romanian Journal of Medical Practice*, 13 (1): 67-75. Available: https://www.academia.edu/download/93068025/RJMP_2018_1_Art-12.pdf (Accessed 9 September 2022).

Muttil, N., Nasrin, T. and Sharma, A. K. 2023. Impacts of extreme rainfalls on sewer overflows and WSUD-based mitigation strategies: a review. *Water*, 15 (3): 429. Available: https://www.mdpi.com/2073-4441/15/3/429?utm_campaign=releaseissue_waterutm_medium=emailutm_source=releaseissueutm_term=doilink171 (Accessed 12 May 2025).

Munyai, R. B., Chikoore, H., Musyoki, A., Chakwizira, J., Muofhe, T. P., Xulu, N. G. and Manyanya, T. C. 2021. Vulnerability and adaptation to flood hazards in rural settlements of Limpopo province, South Africa. *Water*, 13 (24): 3490. Available: <https://www.mdpi.com/2073-4441/13/24/3490> (Accessed 5 July 2022).

Musyoki, A., Murungweni, F. M. and Thifhulufhelwi, R. 2016. The impact of and responses to flooding in Thulamela Municipality, Limpopo Province, South Africa. *Jàmbá: Journal of Disaster Risk Studies*, 8 (2): 1–10. Available: <https://journals.co.za/doi/abs/10.4102/jamba.v8i2.166> (Accessed 27 July 2022).

Mweshi, G. K. and Sakyi, K. 2020. Application of sampling methods for the research design. *Archives of Business Review*, 8 (11): 180–193. Available: https://www.academia.edu/download/65093418/ABR_9042.pdf (Accessed 13 October 2022).

Mwita, K. M. 2022a. Strengths and weaknesses of qualitative research in social science studies. *International Journal of Research in Business and Social Science*, 11 (6): 618–625. Available: <https://search.proquest.com/openview/72e0b1a1433301902697399ccf450bc2/1?pq-origsite=gscholar&cbl=2032017> (Accessed 3 March 2023).

Mwita, K. 2022b. Factors to consider when using qualitative interviews in data collection. *Social Sciences Humanities and Education Journal (SHE Journal)*, 3(3): 313: 323. Available: https://www.researchgate.net/publication/363782655_Factors_to_Consider_when_Using_Qualitative_Interviews_in_Data_Collection (Accessed 2 March 2023).

Myeni, T. 'Catastrophic' Durban floods leave trail of death and destruction (online).

2022. Available: <https://www.aljazeera.com/news/2022/4/15/s-africa-durban-residents-count-their-losses-in-intense-floods> (Accessed 8 July 2023).

Naeem, M., Ozuem, W., Howell, K. and Ranfagni, S. 2023. A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International Journal of Qualitative Methods*, 22: 1-18. Available: <https://journals.sagepub.com/doi/abs/10.1177/16094069231205789> (Accessed 11 December 2023).

Naidoo, K., Manyangadze, T. and Lokotola, C. L. 2022. Primary care disaster management for extreme weather events, South Africa. *African Journal of Primary Health Care & Family Medicine*, 14 (1): e1–e2. Available: <https://journals.co.za/doi/abs/10.4102/phcfm.v14i1.3778> (Accessed 15 March 2023).

Naidoo, K., Nzimande, N. P. and Morris, F. 2023. Investigating the socioeconomic impacts of sewage spillages on businesses in the Umhlanga Rocks coastline area. *Jambá-Journal of Disaster Risk Studies*, 16 (1): 1602. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11079421/> (Accessed 20 December 2024).

Nakova, A. and Milenkova, V. 2023. Disasters—sociocultural effects on the quality of life of local communities. *Postmodernism Problems*, 13 (1): 55–67. Available: <https://www.ceeol.com/search/article-detail?id=1115394> (Accessed 19 February 2024).

Narita, K., Hoshida, S. and Kario, K. 2021. Time course of disaster-related cardiovascular disease and blood pressure elevation. *Hypertension Research*, 44 (11): 1534–1539. Available: [10.1038/s41440-021-00698-y](https://doi.org/10.1038/s41440-021-00698-y) (Accessed 7 February 2023).

Naser-Hall, E. 2013. The disposable class: Ensuring poverty consciousness in natural disaster preparedness. *DePaul Journal for Social Justice*, 7: 55. Available: https://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/depjsj7§ion=6 (Accessed 11 October 2022).

National Center for Disaster Preparedness. 2015. *Common stress reactions experienced by children (1–18 years) after a disaster and coping strategies to use during their time of trauma*. Available: <https://rcrctoolbox.org/wp-content/uploads/2018/05/CommonStressReactionsExperiencedbyChildren.pdf> (Accessed 19 June 2022).

National Institute of Communicable Diseases. 2022. *Communicable diseases*. Available: <https://www.nicd.ac.za/wp-content/uploads/2022/04/NICD-Monthly-Communique-April.pdf> (Accessed 12 September 2022).

Ndanduleni, A. U. C., Radebe, T. B. and Huan, Z. 2023. Reduction of temperature fluctuation in a South African shack house using phase change material insulation. *Building and Environment*, 241: 110376. Available: <https://www.sciencedirect.com/science/article/pii/S0360132323004031> (Accessed 4 April 2024).

Neelofar, M., Qadri, H. and Bhat, R. 2018. Socio-economic and health impacts of floods in a trans-Himalayan ecosystem. *Journal of Geography & Natural Disasters*, 8 (2): 2167–0587.1000227. Available: https://www.researchgate.net/profile/Rohi-Mir/publication/342888844_Socio-economic_and_Health_Impacts_of_Floods_in_a_Trans-Himalayan_Ecosystem/links/5f0c2f26299bf1074452d197/Socio-economic-and-Health-Impacts-of-Floods-in-a-Trans-Himalayan-Ecosystem.pdf (Accessed 28 May 2022).

Negi, S. 2022. Humanitarian logistics challenges in disaster relief operations: A humanitarian organisations' perspective. *Journal of Transport and Supply Chain Management*, 16: 691. Available: <https://journals.co.za/doi/abs/10.4102/jtscm.v16i0.691> (Accessed 2 May 2025).

Nejati-Zarnaqi, B., Khorasani-Zavareh, D., Sohrabizadeh, S., Ghaffari, M., Sabour, S., Nouri, F. and Mohammadi, R. 2024. Factors affecting the spiritual rehabilitation of affected people after natural disasters: a systematic review. *Journal of Injury and*

Violence Research, 16 (02): 159–168. Available:
<https://jivresearch.org/jivr/index.php/jivr/article/view/1877> (Accessed 6 May 2025).

Neumayer, E. and Plümper, T. 2008. The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy, 1981–2002. *Annals of the association of American Geographers*, 97 (3): 551–566. Available:
<https://www.tandfonline.com/doi/abs/10.1111/j.1467-8306.2007.00563.x> (Accessed 12 May 2022).

Neves, J. L. 2024. Urban planning for flood resilience under technical and financial constraints: The role of planners and competence development in building a flood-resilient city in Matola, Mozambique. *City and Environment Interactions*, 22: 100147. Available: <https://www.sciencedirect.com/science/article/pii/S2590252024000072> (Accessed 9 December 2024).

Newnham, E. A., Mergelsberg, E. L., Chen, Y., Kim, Y., Gibbs, L., Dzidic, P. L., DaSilva, M. I., Chan, E. Y., Shimomura, K. and Narita, Z. 2022. Long term mental health trajectories after disasters and pandemics: A multilingual systematic review of prevalence, risk and protective factors. *Clinical Psychology Review*, 97: 102203. Available: <https://www.sciencedirect.com/science/article/pii/S0272735822000885> (Accessed 8 March 2023).

Ngcamu, B. S. 2023. Application of the disaster management cycle and climate change: Studying flood disasters in South Africa. *Social Sciences & Humanities Open*, 8 (1): 100657. Available:
<https://www.sciencedirect.com/science/article/pii/S2590291123002620> (Accessed 4 August 2024).

Nhamo, G., Chapungu, L. and Mutanda, G. W. 2025. Trends and impacts of climate-induced extreme weather events in South Africa (1920–2023). *Environmental Development*, 55: 101183. Available:
<https://www.sciencedirect.com/science/article/pii/S2211464525000491> (Accessed 12 May 2025).

Nicholls, R., Zanuttigh, B., Vanderlinden, J. P., Weisse, R., Silva, R., Hanson, S., Narayan, S., Hoggart, S., Thompson, R. C. and de Vries, W. 2015. *Developing a holistic approach to assessing and managing coastal flood risk*. United States: Elsevier. Available: <https://www.sciencedirect.com/science/article/pii/B9780123973108000026> (Accessed 9 September 2022).

Njogu, H. W. 2021. Effects of floods on infrastructure users in Kenya. *Journal of Flood Risk Management*, 14 (4): e12746. Available: <https://doi.org/10.1111/jfr3.12746> (Accessed 3 March 2022).

Noe, R. S., Schnall, A. H., Wolkin, A. F., Podgornik, M. N., Wood, A. D., Spears, J. and Stanley, S. A. 2016. Disaster-related injuries and illnesses treated by American Red Cross disaster health services during Hurricanes Gustav and Ike. *Southern Medical Journal*, 106 (1): 102. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC4910155/> (Accessed 4 June 2024).

Noone, C. and Yang, K. 2022. Community-based responses to loneliness in older people: A systematic review of qualitative studies. *Health and Social Care in the Community*, 30 (4): e859–e873. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1111/hsc.13682> (Accessed 21 July 2023).

Nor Diana, M. I., Muhamad, N., Taha, M. R., Osman, A. and Alam, M. M. 2021. Social vulnerability assessment for landslide hazards in Malaysia: A systematic review study. *Land*, 10 (3): 315. Available: <https://www.mdpi.com/2073-445X/10/3/315> (Accessed 12 June 2022).

Nöthling, J., Gibbs, A., Washington, L., Gigaba, S., Willan, S., Abrahams, N. and Jewkes, R. 2023. Change in emotional distress, anxiety, depression and PTSD from pre-to post-flood exposure in women residing in low-income settings in South Africa. *Archives of Women's Mental Health*, 27 (2): 201–218. Available: <https://link.springer.com/article/10.1007/s00737-023-01384-3> (Accessed 3 November 2024).

Nowell, B., Steelman, T., Velez, A.-L. K. and Yang, Z. 2018. The structure of effective governance of disaster response networks: Insights from the field. *The American Review of Public Administration*, 48 (7): 699–715. Available: <https://journals.sagepub.com/doi/10.1177/0275074017724225> (Accessed 20 April 2022).

Nowell, L. S., Norris, J. M., White, D. E. and Moules, N. J. 2017. Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16 (1): 1-13. Available: <https://journals.sagepub.com/doi/abs/10.1177/1609406917733847> (Accessed 7 June 2022).

Ntanganedzeni, B. and Nobert, J. 2021. Flood risk assessment in Luvuvhu river, Limpopo province, South Africa. *Physics and Chemistry of the Earth, Parts A/B/C*, 124: 102959. Available: <https://www.sciencedirect.com/science/article/pii/S1474706520304046> (Accessed 25 May 2022).

Ntombela, J. N. and Jili, N. N. 2020. Local government and the provision of low-cost housing in South Africa. *e-BANGI Journal*, 17 (8). Available: <https://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&auth type=crawler&jrnl=19853505&AN=147591629&h=9Rr9Ww5hBDGv0IJ%2FYmacvZ7eLKkXZK1jQdAvGPHAshC7Y%2Bmo%2BPDemo5CtjB4hPdPxc9QiGjtz98T%2F2MWU6yARQ%3D%3D&crl=c> (Accessed 7 May 2025).

Ntontis, E., Drury, J., Amlôt, R., Rubin, G. J. and Williams, R. 2020. Endurance or decline of emergent groups following a flood disaster: Implications for community resilience. *International Journal of Disaster Risk Reduction*, 45: 101493. Available: <https://www.sciencedirect.com/science/article/pii/S2212420919309744> (Accessed 8 18 November 2022).

Nurdin, M. R. 2024. Islamic faith-based organisations and their role in building social capital for post-disaster recovery in Indonesia. *Disasters*, 48: e12635. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1111/disa.12635> (Accessed 4 January 2025).

2025).

Nyirenda, L., Kumar, M. B., Theobald, S., Sarker, M., Simwinga, M., Kumwenda, M., Johnson, C., Hatzold, K., Corbett, E. L., Sibanda, E. and Taegtmeyer, M. 2020. Using research networks to generate trustworthy qualitative public health research findings from multiple contexts. *BMC Medical Research Methodology*, 20 (1): 13. Available: <https://link.springer.com/article/10.1186/s12874-019-0895-5> (Accessed 12 June 2022).

Nzwili, F. *South African churches provide relief in KwaZulu Natal flood disaster* (online). 2022. Available: <https://www.oikoumene.org/news/south-african-churches-provide-relief-in-kwazulu-natal-flood-disaster> (Accessed 7 September 2023).

O'Hare, P. and White, I. 2018. Beyond 'just' flood risk management: the potential for—and limits to—alleviating flood disadvantage. *Regional Environmental Change*, 18: 385–396. Available: <https://link.springer.com/article/10.1007/s10113-017-1216-3> (Accessed 8 May 2025).

Occhipinti, L. A. 2015. *Faith-based organizations and development*. Abingdon, Oxon: Routledge. Available: <https://api.taylorfrancis.com/content/chapters/edit/download?identifierName=doi&identifierValue=10.4324/9780203694442-29&type=chapterpdf> (Accessed 7 September 2022).

Odiyo, J., Makungo, R., Mathivha, F. I. and Nkuna, T. R. 2019. Hydrological hazards in Vhembe district in Limpopo Province, South Africa. *Jàmbá: Journal of Disaster Risk Studies*, 11 (2): 1–13. Available: <https://journals.co.za/doi/abs/10.4102/jamba.v11i2.698> (Accessed 27 May 2022).

Ogie, R. I., James, S., Moore, A., Dilworth, T., Amirghasemi, M. and Whittaker, J. 2022. Social media use in disaster recovery: A systematic literature review. *International Journal of Disaster Risk Reduction*, 70: 102783. Available: <https://www.sciencedirect.com/science/article/pii/S2212420922000024> (Accessed 3

January 2023).

Okuda, K. and Kawasaki, A. 2022. Effects of disaster risk reduction on socio-economic development and poverty reduction. *International Journal of Disaster Risk Reduction*, 80: 103241. Available:

<https://www.sciencedirect.com/science/article/pii/S2212420922004605> (Accessed 18 April 2023).

Okyere, S. A., Abunyewah, M., Addai, J., Mensah, S. L., Frimpong, L. K. and Kwang, C. 2024. Faith-based organisations and disaster management in informal urban Accra. *Environmental Hazards*, 23 (5): 482–505. Available:

<https://www.tandfonline.com/doi/abs/10.1080/17477891.2024.2333738> (Accessed 17 November 2024).

Olanrewaju, C. C., Chitakira, M., Olanrewaju, O. A. and Louw, E. 2019. Impacts of flood disasters in Nigeria: A critical evaluation of health implications and management. *Jamba: Journal of Disaster Risk Studies*, 11 (1): 557. Available: <https://jamba.org.za/index.php/jamba/article/view/557> (Accessed 17 May 2022).

Olanrewaju, C. C. and Reddy, M. 2022. Assessment and prediction of flood hazards using standardized precipitation index—A case study of eThekweni metropolitan area. *Journal of Flood Risk Management*, 15 (2): e12788. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1111/jfr3.12788> (Accessed 3 June 2022).

Olmos-Vega, F. M., Stalmeijer, R. E., Varpio, L. and Kahlke, R. 2023. A practical guide to reflexivity in qualitative research: AMEE Guide No. 149. *Medical Teacher*, 45 (3): 241–251. Available:

<https://www.tandfonline.com/doi/abs/10.1080/0142159X.2022.2057287> (Accessed 19 June 2024).

Onyeaka, H., Ejiohuo, O., Taiwo, O. R., Nnaji, N. D., Odeyemi, O. A., Duan, K., Nwaiwu, O. and Odeyemi, O. 2024. The intersection of food security and mental

health in the pursuit of sustainable development goals. *Nutrients*, 16 (13): 2036. Available: <https://www.mdpi.com/2072-6643/16/13/2036> (Accessed 12 March 2025).

Oranga, J. and Matere, A. 2023. Qualitative research: Essence, types and advantages. *Open Access Library Journal*, 10 (12): 1–9. Available: <https://www.scirp.org/journal/paperinformation?paperid=129964> (Accessed 7 May 2022).

Organizational Resilience. 2023. *5 Phases of emergency management*. Available: <https://www.unr.edu/organizational-resilience/phases> (Accessed 12 February 2024).

Osman, A., Ansah-Mensah, K., Amoah-Nuamah, J. and Atanga, R. A. 2023. Flood related depression and replacement of damaged household items. *Progress in Disaster Science*, 18: 100280. Available: <https://www.sciencedirect.com/science/article/pii/S2590061723000078> (Accessed 23 March 2024).

Othman, F., Sharip, S. M., Kasim, S., Kamdari, N. and Baharuddin, F. 2022. Flooding: The mental, social and health effects of flood disasters. *International Journal of Academic Research in Business and Social Sciences*, 12 (10): 2569–2582. Available: <https://www.academia.edu/download/95004453/flooding-the-mental-social-and-health-effects-of-flood-disasters.pdf> (Accessed 20 March 2023).

Otorkpa, C., Otorkpa, O. J., Olaniyan, O. E. and Adebola, O. A. 2024. Mental health issues of children and young people displaced by conflict: A scoping review. *PLOS Mental Health*, 1 (6): e0000076. Available: <https://journals.plos.org/mentalhealth/article?id=10.1371/journal.pmen.0000076> (Accessed 8 April 2025).

Otto, I. M., Reckien, D., Reyer, C. P., Marcus, R., Le Masson, V., Jones, L., Norton, A. and Serdeczny, O. 2017. Social vulnerability to climate change: a review of concepts and evidence. *Regional Environmental Change*, 17: 1651–1662. Available: <https://link.springer.com/article/10.1007/s10113-017-1105-9> (Accessed 29 July

2022).

Owen, J. R., Kemp, D., van der Watt, P., Harris, J., Li Ern Ang, M. and Marais, L. 2024. Disaster scenes as a foundation for emergency response planning. *International Journal of Disaster Risk Reduction*, 113: 104795. Available: <https://doi.org/10.1016/j.ijdr.2024.104795> (Accessed 4 December 2024).

Pacetti, T., Caporali, E. and Rulli, M. C. 2017. Floods and food security: A method to estimate the effect of inundation on crops availability. *Advances in Water Resources*, 110: 494–504. Available: <https://www.sciencedirect.com/science/article/pii/S0309170817306498> (Accessed 3 June 2022).

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N. and Hoagwood, K. 2015. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research*, 42: 533–544. Available: <https://link.springer.com/article/10.1007/s10488-013-0528-y> (Accessed 9 August 2022).

Panebarco, T. 2025. *Role of stakeholder interaction in the context of disaster management*. Available: https://www.researchgate.net/profile/Tommaso-Panebarco/publication/388646185_Role_of_Stakeholder_interaction_in_the_context_of_disaster_management/links/67a0d52a207c0c20fa748c81/Role-of-Stakeholder-interaction-in-the-context-of-disaster-management.pdf (Accessed 12 June 2025).

Papadopoulos, I., Lazzarino, R., Koulouglioti, C., Ali, S. and Wright, S. 2022. Towards a national strategy for the provision of spiritual care during major health disasters: A qualitative study. *The International Journal of Health Planning and Management*, 37 (4): 1990–2006. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/hpm.3443> (Accessed 12 March 2024).

Paprotny, D., Sebastian, A., Morales-Nápoles, O. and Jonkman, S. N. 2018. Trends in flood losses in Europe over the past 150 years. *Nature Communications*, 9 (1): 1985. Available: <https://www.nature.com/articles/s41467-018-04253-1> (Accessed 9 September 2022).

Paradis, E., O'Brien, B., Nimmon, L., Bandiera, G. and Martimianakis, M. A. 2016. Design: Selection of data collection methods. *Journal of Graduate Medical Education*, 8 (2): 263–264. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC4857496/> (Accessed 21 July 2022).

Parida, Y. and Prasad Dash, D. 2020. Rethinking the effect of floods and financial development on economic growth: evidence from the Indian states. *Indian Growth and Development Review*, 13 (3): 485–503. Available: <https://www.emerald.com/insight/content/doi/10.1108/IGDR-05-2019-0044/full/html> (Accessed 7 May 2025).

Parikh, P., Bisaga, I., Loggia, C., Georgiadou, M. C. and Ojo-Aromokudu, J. 2020. Barriers and opportunities for participatory environmental upgrading: Case study of Havelock informal settlement, Durban. *City and Environment Interactions*, 5: 100041. Available: <https://www.sciencedirect.com/science/article/pii/S2590252020300222> (Accessed 18 May 2022).

Paterson, D. L., Wright, H. and Harris, P. N. 2018. Health risks of flood disasters. *Clinical Infectious Diseases*, 67 (9): 1450–1454. Available: <https://academic.oup.com/cid/article-abstract/67/9/1450/4945455> (Accessed 3 June 2022).

Patino, C. M. and Ferreira, J. C. 2018. Inclusion and exclusion criteria in research studies: Definitions and why they matter. *Jornal Brasileiro de Pneumologia*, 44: 84–84. Available: <https://www.scielo.br/j/jbpneu/a/LV6rLNpPZsVFZ7mBqzjXkXD/> (Accessed 19 July 2022).

Peacock, W. G., Dash, N., Zhang, Y. and Van Zandt, S. 2018. Post-disaster

sheltering, temporary housing and permanent housing recovery. *Handbook of disaster research*. Available:

https://www.researchgate.net/publication/323940057_Post-Disaster_Sheltering_Temporary_Housing_and_Permanent_Housing_Recovery (Accessed 19 July 2022).

Peden, A. E., Mayhew, A., Baker, S. D., Mayedwa, M. and Saunders, C. J. 2023. Exploring flood response challenges, training needs, and the impact of online flood training for lifeguards and water safety professionals in South Africa. *International Journal of Environmental Research and Public Health*, 20 (16): 6573. Available: <https://www.mdpi.com/1660-4601/20/16/6573> (Accessed 12 May 2025).

Percival, S., Gaterell, M. and Teeuw, R. 2018. Urban neighbourhood flood vulnerability and risk assessments at different diurnal levels. *Journal of Flood Risk Management*, 12 (3): e12466. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1111/jfr3.12466> (Accessed 1 June 2025).

Peirce, A. M., Espira, L. M. and Larson, P. S. 2022. Climate change related catastrophic rainfall events and non-communicable respiratory disease: A systematic review of the literature. *Climate*, 10 (7): 101. Available: <https://www.mdpi.com/2225-1154/10/7/101> (Accessed 12 June 2025).

Percival, S., Gaterell, M. and Teeuw, R. 2018. Urban neighbourhood flood vulnerability and risk assessments at different diurnal levels. *Journal of Flood Risk Management*, 12 (3): e12466. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1111/jfr3.12466> (Accessed 1 June 2025).

Peters, L. E., Clark-Ginsberg, A., McCaul, B., Cáceres, G., Nuñez, A. L., Balagna, J., López, A., Patel, S. S., Patel, R. B. and Van Den Hoek, J. 2022. Informality, violence, and disaster risks: Coproducing inclusive early warning and response systems in urban informal settlements in Honduras. *Frontiers in Climate*, 4: 937244. Available: <https://www.frontiersin.org/articles/10.3389/fclim.2022.937244/full> (Accessed 8 April 2023).

Pfefferbaum, B., Weems, C. F., Scott, B. G., Nitiéma, P., Noffsinger, M. A., Pfefferbaum, R. L., Varma, V. and Chakraborty, A. 2015. Research methods in child disaster studies: A review of studies generated by the September 11, 2001, terrorist attacks; the 2004 Indian Ocean tsunami; and Hurricane Katrina. In: *Proceedings of Child & Youth Care Forum*. New York: Springer, 285–337. Available: <https://link.springer.com/article/10.1007/s10566-013-9211-4> (Accessed 20 May 2022).

Phillippi, J. and Lauderdale, J. 2018. A guide to field notes for qualitative research: Context and conversation. *Qualitative Health Research*, 28 (3): 381–388. Available: <https://journals.sagepub.com/doi/abs/10.1177/1049732317697102> (Accessed 7 June 2022).

Phillips, B. and Jenkins, P. 2010. The roles of faith-based organizations after Hurricane Katrina. In: Kilmer, R.P., Gil-Rivas, V., Tedeschi, R.G., and Calhoun, L.G. eds. *Helping families and communities recover from disaster: Lessons learned from hurricane Katrina and its aftermath*. Washington, D.C.: American Psychological Association, 215-238. Available: <https://psycnet.apa.org/record/2009-08917-009> (Accessed 10 May 2022).

Phraknoi, N., Sutanto, J., Hu, Y., Goh, Y. S. and Lee, C. E. C. 2023. Older people's needs in urban disaster response: A systematic literature review. *International Journal of Disaster Risk Reduction*, 96: 103809. Available: <https://www.sciencedirect.com/science/article/pii/S2212420923002893> (Accessed 17 March 2024).

Picou, J. S. and Marshall, B. K. 2007. Social impacts of Hurricane Katrina on displaced K–12 students and educational institutions in coastal Alabama counties: Some preliminary observations. *Sociological Spectrum*, 27 (6): 767–780. Available: <https://www.tandfonline.com/doi/abs/10.1080/02732170701534267> (Accessed 17 June 2022).

Pillay, J. 2017. The relationship between housing and children's literacy

achievement: Implications for supporting vulnerable children. *South African Journal of Education*, 37: 1–10. Available:

https://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0256-01002017000200003 (Accessed 20 March 2022).

Pinto, I., Zachariah, M., Wolski, P., Landman, S., Phakula, V., Maluleke, W., Bopape, M., Engelbrecht, C., Jack, C. and McClure, A. 2022. *Climate change exacerbated rainfall causing devastating flooding in Eastern South Africa. World Weather Attribution*. Available: <https://www.worldweatherattribution.org/climate-change-exacerbated-rainfall-causing-devastating-flooding-in-eastern-south-africa/> (Accessed November 2022).

Pop-Jordanova, N. 2021. Grief: Aetiology, symptoms and management. *Prilozi*, 42 (2): 9–18. Available: <https://sciendo.com/pdf/10.2478/prilozi-2021-0014> (Accessed 12 March 2023).

Powers, J. E., Mureithi, M., Mboya, J., Campolo, J., Swarthout, J. M., Pajka, J., Null, C. and Pickering, A. J. 2023. Effects of high temperature and heavy precipitation on drinking water quality and child hand contamination levels in rural Kenya. *Environmental Science & Technology*, 57 (17): 6975–6988. Available: <https://pubs.acs.org/doi/abs/10.1021/acs.est.2c07284> (Accessed 12 March 2024).

Pragat, P. 2023. Examining the Intersection of Seva and Public Health Policy. *International Archives of Public Health and Community Medicine*, 7. Available: 10.23937/2643-4512/1710090 (Accessed 13 August 2023).

Prasad, A. S. and Francescutti, L. H. 2017. *Natural Disasters*. Oxford: Academic Press. Available: <https://www.sciencedirect.com/science/article/pii/B9780128036785005191> (Accessed 15 March 2022).

Prayag, G., Ozanne, L. K. and Spector, S. 2021. A psychological wellbeing perspective of long-term disaster recovery following the Canterbury earthquakes.

International Journal of Disaster Risk Reduction, 63: 102438. Available: <https://www.sciencedirect.com/science/article/pii/S221242092100399X> (Accessed 3 May 2025).

Prianto, A. L., Usman, S., Amri, A. R., Nurmandi, A., Qodir, Z., Jubba, H. and Ilik, G. 2023. Faith-Based Organizations' Humanitarian Work from the Disaster Risk Governance Perspective: Lessons from Covid-19 Pandemic in Indonesia. *Mazahib*, 22 (1): 129–174. Available: <https://journal.uinsi.ac.id/index.php/mazahib/article/view/6317> (Accessed 2 November 2023).

Priya, A. 2021. Case study methodology of qualitative research: Key attributes and navigating the conundrums in its application. *Sociological Bulletin*, 70 (1): 94–110. Available: <https://journals.sagepub.com/doi/abs/10.1177/0038022920970318> (Accessed 29 June 2022).

Priyanti, R. P., Hidayah, N., Rosmaharani, S., Nahariani, P., Asri, Mukarromah, N. and Mundakir. 2019. Community preparedness in flood disaster: A qualitative study. *International Quarterly of Community Health Education*, 40 (1): 67–68. Available: <https://journals.sagepub.com/doi/abs/10.1177/0272684X19853169> (Accessed 8 September 2022).

Proudfoot, K. 2023. Inductive/Deductive hybrid thematic analysis in mixed methods research. *Journal of Mixed Methods Research*, 17 (3): 308–326. Available: [10.1177/15586898221126816](https://doi.org/10.1177/15586898221126816) (Accessed 8 September 2023).

Pulla, V. and Carter, E. 2018. Employing interpretivism in social work research. *International Journal of Social Work and Human Services Practice*, 6 (1): 9–14. Available: <https://www.academia.edu/download/63197938/IJRH2-1929047620200504-61084-3v3zjb.pdf> (Accessed 21 July 2022).

Quaill, J., Barker, R. and West, C. 2019. Experiences of individuals with physical disabilities in natural disasters: An integrative review. *Australian Journal of*

Emergency Management, 33. Available:

https://www.researchgate.net/publication/326912087_Experiences_of_individuals_with_physical_disabilities_in_natural_disasters_an_integrative_review (Accessed 1 April 2024).

Queensland Disaster Management. 2022. *Queensland 2021/22 State disaster risk report*. Available:

https://www.disaster.qld.gov.au/__data/assets/pdf_file/0020/436070/2023-State-Disaster-Risk-Report.pdf (Accessed: 19 November 2022).

Quesada-Román, A. 2022. Disaster risk assessment of informal settlements in the Global South. *Sustainability*, 14 (16): 10261. Available: <https://www.mdpi.com/2071-1050/14/16/10261> (Accessed 2 March 2023).

Qiu, J., Tan, H., Yuan, S., Lv, C., Wang, P., Cao, S. and Zhang, Y. 2024. Selection of urban-flood-shelter locations based on risk assessment. *Water-Energy Nexus*, 7: 151–162. Available:

<https://www.sciencedirect.com/science/article/pii/S2588912524000080> (Accessed 9 February 2025).

Rahman, M. M., Shobuj, I. A., Hossain, M. T., Alam, E., Islam, M. K. and Hossain, M. K. 2025. Flood impact on men's mental health: evidence from flood-prone areas of Bangladesh. *Frontiers in Public Health*, 13: 1529558. Available:

<https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2025.1529558/full> (Accessed 3 May 2025).

Rahman, M. M., Shobuj, I. A., Hossain, M. T. and Tasnim, F. 2023. Impact of Disaster on mental health of women: A case study on 2022 flash flood in Bangladesh. *International Journal of Disaster Risk Reduction*, 96: 103935. Available: <https://www.sciencedirect.com/science/article/pii/S2212420923004156> (Accessed 7 March 2024).

Rai, A., Sharma, A. J. and Subramanyam, M. A. 2021. Droughts, cyclones, and intimate partner violence: A disastrous mix for Indian women. *International Journal of*

Disaster Risk Reduction, 53: 102023. Available:

<https://www.sciencedirect.com/science/article/abs/pii/S2212420920315259>

(Accessed 9 August 2022).

Rakotoarison, Z. R., Dietrich, S. and Hiilamo, H. 2021. Faith as an asset in a community development project: The case of Madagascar. *HTS Teologiese Studies/Theological Studies*, 77 (4). Available:

<https://www.ajol.info/index.php/hts/article/view/232921> (Accessed 2 February 2025).

Ramakrishna, G., Gaddam, S. R. and Daisy, I. 2014. Impact of floods on food security and livelihoods of IDP tribal households: The case of Khammam region of India. *International Journal of Development and Economics Sustainability*, 2 (1): 11–24.

Available:

https://www.researchgate.net/publication/281428218_IMPACT_OF_FLOODS_ON_FOOD_SECURITY_AND_LIVELIHOODS_OF_IDP_TRIBAL_HOUSEHOLDS_THE_CASE_OF_KHAMMAM_REGION_OF_INDIA (Accessed 16 August 2022).

Ramalho, R., Adams, P., Huggard, P. and Hoare, K. 2015. Literature review and constructivist grounded theory methodology. In: *Proceedings of Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*. Available:

<http://www.qualitative-research.net/index.php/fqs/article/view/2313> (Accessed 2 March 2023).

Ramiaramanana, F. N. and Teller, J. 2021. Urbanization and floods in Sub-Saharan Africa: Spatiotemporal study and analysis of vulnerability factors—case of Antananarivo Agglomeration (Madagascar). *Water*, 13 (2): 149. Available: <https://www.mdpi.com/2073-4441/13/2/149> (Accessed 19 November 2022).

Rao, S. 2020. A natural disaster and intimate partner violence: Evidence over time. *Social Science & Medicine*, 247: 112804. Available:

<https://www.sciencedirect.com/science/article/pii/S027795362030023X> (Accessed 9 July 2022).

Ratuliu, G., Geneo, M. and Tiwatu, F. V. 2023. Analysis of wound etiology on floods and landslides disasters in Manado City. *Jurnal Kesehatan*, 12 (1): 1–6. Available: <http://jurnalkesehatanstikesnw.ac.id/index.php/stikesnw/article/view/112> (Accessed 7 May 2025).

Reangsing, C., Rittiwong, T. and Schneider, J. K. 2022. Effects of mindfulness meditation interventions on depression in older adults: A meta-analysis. *Aging & Mental Health*, 25 (7): 1181–1190. Available: <https://pubmed.ncbi.nlm.nih.gov/32666805/> (Accessed 9 April 2022).

Reddy, V., Devi, M. J. and Anbumozhi, V. 2019. Ensuring food and nutritional security in the face of disasters and climate change: what is the adaptive solution. *Towards a resilient ASEAN*, 1: 290–330. Available: https://www.academia.edu/download/64934607/15_Disaster_Climate_change_vol.1_Chapter_11.pdf (Accessed 7 March 2023).

Reed, C., Anderson, W., Kruczkiewicz, A., Nakamura, J., Gallo, D., Seager, R. and McDermid, S. S. 2022. The impact of flooding on food security across Africa. *Proceedings of the National Academy of Sciences*, 119 (43): e2119399119. Available: <https://www.pnas.org/doi/abs/10.1073/pnas.2119399119> (Accessed 6 Feb 2023).

Rees, E., Beeber, S. N., Sampson, R. and Lietz, J. P. 2023. Empowering single parents: Navigating socio-economic challenges and fostering resilience in family well-being. *Law and Economics*, 17 (2): 131–150. Available: <https://journals.ristek.or.id/index.php/LE/article/view/5> (Accessed 12 December 2023).

Rezayat, A. A., Sahebdel, S., Jafari, S., Kabirian, A., Rahnejat, A. M., Farahani, R. H., Mosaed, R. and Nour, M. G. 2020. Evaluating the prevalence of PTSD among children and adolescents after earthquakes and floods: a systematic review and meta-analysis. *Psychiatric Quarterly*, 91 (4): 1265–1290. Available:

<https://link.springer.com/article/10.1007/s11126-020-09840-4> (Accessed 2 February 2023).

Rieckmann, A., Tamason, C. C., Gurley, E. S., Rod, N. H. and Jensen, P. K. M. 2018. Exploring droughts and floods and their association with cholera outbreaks in sub-Saharan Africa: A register-based ecological study from 1990 to 2010. *The American Journal of Tropical Medicine and Hygiene*, 98 (5): 1269. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC5953376/> (Accessed 14 May 2022).

Ringo, J., Sabai, S. and Mahenge, A. 2025. Contribution of flood early warning response measures in reducing flood effects in Kilosa District, Tanzania. *Climate Services*, 37: 100534. Available: <https://www.sciencedirect.com/science/article/pii/S240588072400089X> (Accessed

Rivera, F. I., Belligoni, S., Arroyo Rodriguez, V., Chapdelaine, S., Nannuri, V. and Steen Burgos, A. 2024. Compound crises: The Impact of emergencies and disasters on mental health services in Puerto Rico. *International Journal of Environmental Research and Public Health*, 21 (10). Available: <https://www.mdpi.com/1660-4601/21/10/1273> (Accessed 12 January 2025).

Rivera, J. D. and Nickels, A. E. 2014. Social capital, community resilience, and faith-based organizations in disaster recovery: A case study of Mary Queen of Vietnam Catholic Church. *Risk, Hazards & Crisis in Public Policy*, 5 (2): 178–211. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/rhc3.12050> (Accessed 3 March 2024).

Rogers, J. S., Maneta, M. M., Sain, S. R., Madaus, L. E. and Hacker, J. P. 2025. The role of climate and population change in global flood exposure and vulnerability. *Nature Communications*, 16 (1): 1287. Available: <https://www.nature.com/articles/s41467-025-56654-8> (Accessed 7 May 2025).

Rosinger, A. Y., Rosinger, K., Barnhart, K., Todd, M., Hamilton, T., Arias Cuellar, K. and Nate, D. 2023. When the flood passes, does health return? A short panel

examining water and food insecurity, nutrition, and disease after an extreme flood in lowland Bolivia. *American Journal of Human Biology*, 35 (1): e23806. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/ajhb.23806> (Accessed March 2025).

Roslinawati. 2021. Changes in society after natural disasters. *International Journal of Research and Innovation in Social Science*, 5 (1): 2454–6186. Available: <https://rsisinternational.org/journals/ijriss/Digital-Library/volume-5-issue-1/493-495.pdf> (Accessed 21 December 2022).

Leedy, P.D., and Ormrod, J.E. 2015. *Practical research. Planning and design*. Boston, MA: Pearson. Available: <https://jalt.journals.publicknowledgeproject.org/index.php/jalt/article/view/43> (Accessed 23 March 2023).

Rufat, S., Comby, E., Lhomme, S. and Santoni, V. 2024. Context matters when evacuating large cities: Shifting the focus from individual characteristics to location and social vulnerability. *Environmental Science & Policy*, 162: 103925. Available: <https://doi.org/10.1016/j.envsci.2024.103925> (Accessed 9 December 2024).

Ruffing, E. G., Bell, C. A. and Sandage, S. J. 2021. PTSD symptoms in religious leaders: Prevalence, stressors, and associations with narcissism. *Archive for the Psychology of Religion*, 43 (1): 21–40. Available: <https://journals.sagepub.com/doi/abs/10.1177/0084672420926261> (Accessed 19 June 2022).

Ruin, I., Gaillard, J.-C. and Lutoff, C. 2008. How to get there? Assessing motorists' flash flood risk perception on daily itineraries. *Environmental hazards*, 7 (3): 235–244. Available: <https://www.sciencedirect.com/science/article/pii/S1747789107000221> (Accessed 7 August 2022).

Rule, P. and John, V. M. 2024. *Handbook of Case Study Research in the Social Sciences*. Edward Elgar Publishing. Available:

<https://books.google.com/books?hl=en&lr=&id=JK8pEQAAQBAJ&oi=fnd&pg=PR1&ots=f9wfly9e1v&sig=WLXpFTciBKG2jS7tGaLxrjr36SM> (Accessed 27 January 2025).

Russel, R. 2022. Durban floods: 45 people killed as waters wash away homes in South Africa. *news.sky.com*, 11 May 2022. Available: <https://news.sky.com/story/durban-floods-45-people-killed-as-waters-wash-away-homes-in-south-africa-12588759> (Accessed 11 May 2022).

Ryan, B. J., Franklin, R. C., Burkle Jr, F. M., Aitken, P., Smith, E., Watt, K. and Leggat, P. 2016. Reducing disaster exacerbated non-communicable diseases through public health infrastructure resilience: perspectives of Australian disaster service providers. *PLoS currents*. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC5308209/> (Accessed 26 August 2022).

Saad, M., De Medeiros, R. and Mosini, A. C. 2017. Are we ready for a true biopsychosocial–spiritual model? The many meanings of “Spiritual”. *Medicines*, 4 (4): 79. Available: <https://www.mdpi.com/2305-6320/4/4/79> (Accessed 20 April 2022).

Sadeghloo, T. and Mikhak, H. 2022. Analyzing the impacts and experiences of children in disaster. *International Journal of Disaster Risk Reduction*, 76: 103000. Available: <https://doi.org/10.1016/j.ijdr.2022.103000> (Accessed 30 August 2022).

Sadeghi, N. 2022. Continuity of small businesses when facing increased flood risk due to global climate change impacts: A systematic literature review. *International Journal of Disaster Risk Reduction*, 82: 103316. Available: <https://www.sciencedirect.com/science/article/pii/S2212420922005350> (Accessed 12 May 2025).

Saeed, S. A. and Gargano, S. P. 2022. Natural disasters and mental health. *International Review of Psychiatry*, 34 (1): 16–25. Available: <https://www.tandfonline.com/doi/abs/10.1080/09540261.2022.2037524> (Accessed 9 February 2023).

Saidon, R., Ab Manan, S. K., Sueb, R., Abd Rahman, F. N., Sahari, N. H. and Aziz,

N. S. 2020. Religious Psycho-spiritual Care Services for Disaster Victims. *Malaysian Journal of Consumer and Family Economics*, 24 (2): 175–187. Available: <https://majcafe.com/wp-content/uploads/2022/11/Vol-24-S2-2020-Paper-12.pdf> (Accessed 7 October 2022).

Salini, P., Saran, M., Sabitha, N. and Sreeja, S. 2021. Planning for resilient transport infrastructure for disaster prone area—case study of Munnar town. *IOP Conference Series: Materials Science and Engineering*, 1114 (1): 012019. Available: <https://iopscience.iop.org/article/10.1088/1757-899X/1114/1/012019/meta> (Accessed 11 November 2022).

Samonte, P. 2021. Understanding the impacts of post-disaster relocation on family dynamics and resilience. *International Journal of Disaster Resilience in the Built Environment*, 14 (3): 249–265. Available: <https://www.emerald.com/insight/content/doi/10.1108/IJDRBE-03-2021-0026/full/html> (Accessed 2 March 2024).

Sanz-Barbero, B., Linares, C., Vives-Cases, C., González, J. L., López-Ossorio, J. J. and Díaz, J. 2018. Heat wave and the risk of intimate partner violence. *Science of The Total Environment*, 644: 413–419. Available: <https://www.sciencedirect.com/science/article/pii/S0048969718324446> (Accessed 19 July 2022).

Sara, J., Haji, Y. and Gebretsadik, A. 2018. Scabies outbreak investigation and risk factors in east Badewacho district, Southern Ethiopia: Unmatched case control study. *Dermatology Research and Practice*, 2018 (1): 7276938. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1155/2018/7276938> (Accessed 8 August 2022).

Sarfaraz, Y., Rafique, A. and Sohail, N. 2023. Pakistan Flood: Prevalence of Mental Health Crisis an Alarming Situation. *Phoenix Medical Journal*, 5 (1): 54–55. Available: <https://dergipark.org.tr/en/pub/phnx/issue/75186/1189818> (Accessed 15 December 2023).

Satterthwaite, D., Archer, D., Colenbrander, S., Dodman, D., Hardoy, J., Mitlin, D. and Patel, S. 2020. Building resilience to climate change in informal settlements. *One Earth*, 2 (2): 143–156. Available: [https://www.cell.com/one-earth/fulltext/S2590-3322\(20\)30050-6](https://www.cell.com/one-earth/fulltext/S2590-3322(20)30050-6) (Accessed 16 July 2022).

Saulnier, D. D., Hanson, C., Ir, P., Mölsted Alvesson, H. and Von Schreeb, J. 2018. The effect of seasonal floods on health: Analysis of six years of national health data and flood maps. *International Journal of Environmental Research and Public Health*, 15 (4): 665. Available: <https://www.mdpi.com/1660-4601/15/4/665> (Accessed 8 August 2022).

Saunders, M., Thornhill, A. and Lewis, P. 2009. *Understanding research philosophies and approaches*. Available: https://www.researchgate.net/publication/309102603_Understanding_research_philosophies_and_approaches (Accessed 8 April 2022).

Schnall, A. H., Hanchey, A., Nakata, N., Wang, A., Jeddy, Z., Alva, H., Tan, C., Boehmer, T., Bayleyegn, T. and Casey-Lockyer, M. 2020. Disaster-related shelter surveillance during the Hurricane Harvey response–Texas 2017. *Disaster Medicine and Public Health Preparedness*, 14 (1): 49–55. Available: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8822625/> (Accessed 29 June 2023).

Schoch, K. 2020. Case study research. In Burkholder, G., Cox, K., Crawford, L. and Hitchcock, J. eds. *Research Design and Methods: An Applied Guide for the Scholar-Practitioner*. New York, NY: SAGE Publications, 245–258. Available: https://www.researchgate.net/profile/Subhash-Basu-3/post/How_do_i_determine_the_sample_size_for_a_study_looking_at_the_treatment_outcomes_of_mental_health_patients_in_a_community_house/attachment/5ebbae3eead4db0001551c21/AS%3A890646755811328%401589358142328/download/105275_book_item_105275.pdf (Accessed 7 August 2022).

Scholes, R. and Engelbrecht, F. 2021. *Climate impacts in southern Africa during the 21st Century*. Available: <https://cer.org.za/wp-content/uploads/2021/09/Climate->

impacts-in-South-Africa_Final_September_2021.FINAL_.pdf (Accessed 7 December 2023).

Schuster, M., Stein, B., Jaycox, L. H., Collins, R., Marshall, G., Elliott, M., Zhou, A., Kanouse, D., Morrison, J. and Berry, S. 2001. A national survey of stress reactions after the September 11, 2001, Terrorist attacks. *New England Journal of Medicine*, 345 (20): 1507–1512. Available: <https://www.nejm.org/doi/full/10.1056/NEJM200111153452024> (Accessed 4 March 2022).

Sedighi, T., Varga, L., Hosseinian-Far, A. and Daneshkhah, A. 2021. Economic evaluation of mental health effects of flooding using Bayesian networks. *International Journal of Environmental Research and Public Health*, 18 (14): 7467. Available: <https://www.mdpi.com/1660-4601/18/14/7467> (Accessed 2 March 2022).

Sekhani, R., Mohan, D., Mistry, J., Singh, A. and Mittal, V. 2022. Examining the informality in urban informal settlements—Evidence from Kapashera. *Cities*, 123: 103591. Available: <https://www.sciencedirect.com/science/article/pii/S0264275122000300> (Accessed 6 April 2023).

Sen, M. K., Dutta, S. and Kabir, G. 2021. Flood resilience of housing infrastructure modeling and quantification using a bayesian belief network. *Sustainability*, 13 (3): 1026. Available: <https://www.mdpi.com/2071-1050/13/3/1026> (Accessed 12 March 2023).

Sewajyoti. *Concept of Sewa* (online). 2020. Available: <https://sewajyoti.com/CONCEPT-OF-SEWA> (Accessed 19 July 2022).

Shah, A. A., Ye, J., Shaw, R., Ullah, R. and Ali, M. 2020. Factors affecting flood-induced household vulnerability and health risks in Pakistan: The case of Khyber Pakhtunkhwa (KP) Province. *International Journal of Disaster Risk Reduction*, 42: 101341. Available:

<https://www.sciencedirect.com/science/article/pii/S2212420919301219> (Accessed 12 November 2022).

Sharpe, I. and Davison, C. M. 2021. Climate change, climate-related disasters and mental disorder in low- and middle-income countries: A scoping review. *BMJ Open*, 11 (10): e051908. Available: <https://bmjopen.bmj.com/content/11/10/e051908.abstract> Accessed 12 February 2023).

Sheikhi, R. A., Seyedin, H., Qanizadeh, G. and Jahangiri, K. 2020. Role of religious institutions in disaster risk management: A systematic review. *Disaster medicine and public health preparedness*, 15 (2): 239–254. Available: <https://www.scribd.com/document/879395611/Role-of-Religious-Institutions-in-Disaster-Risk-Management-rahim> (Accessed 4 October 2023).

Sheldon, T. L. and Zhan, C. 2019. The impact of natural disasters on US home ownership. *Journal of the Association of Environmental and Resource Economists*, 6 (6): 1169–1203. Available: <https://www.journals.uchicago.edu/doi/abs/10.1086/705398> (Accessed 27 July 2024).

Shevellar, L. and Westoby, P. 2014. " Perhaps?" and" Depends!" The possible implications of disaster related community development for social work. *Advances in Social Work and Welfare Education*, 16 (2): 23–35. Available: <https://search.informit.org/doi/abs/10.3316/INFORMIT.820941263833980> (Accessed 9 October 2022).

Shiba, K., Hikichi, H., Okuzono, S. S., VanderWeele, T. J., Arcaya, M., Daoud, A., Cowden, R. G., Yazawa, A., Zhu, D. T. and Aida, J. 2022. Long-term associations between disaster-related home loss and health and well-being of older survivors: nine years after the 2011 Great East Japan earthquake and tsunami. *Environmental Health Perspectives*, 130 (7): 077001. Available: <https://ehp.niehs.nih.gov/doi/abs/10.1289/EHP10903> (Accessed 23 May 2023).

Shokri, A., Sabzevari, S. and Hashemi, S. A. 2020. Impacts of flood on health of Iranian population: Infectious diseases with an emphasis on parasitic infections. *Parasite Epidemiology and Control*, 9: e00144. Available: <https://www.sciencedirect.com/science/article/pii/S2405673120300131> (Accessed 2 October 2023).

Shunmugam, M. Y. 2024. Religion and poverty alleviation in South Africa. *Theologia Viatorum*, 48 (1): 224. Available: <https://journals.co.za/doi/abs/10.4102/tv.v48i1.224> (Accessed 13 January 2025).

Sibald, S. L., Paciocco, S., Fournie, M., Van Asseldonk, R. and Scurr, T. 2021. Continuing to enhance the quality of case study methodology in health services research. *Healthcare Management Forum*, 34(5): 291-296. Available: <https://journals.sagepub.com/doi/abs/10.1177/08404704211028857> (Accessed 12 June 2022).

Siddik, M. A. B., Munmun, M. S., Ahmed, Z., Nabil, K. and Mubin, N. 2024. Climate change, natural disasters, and mental health of adolescents: A qualitative study from Bangladesh. *International Journal of Population Studies*, 10 (2): 61–70. Available: <https://accscience.com/journal/IJPS/11/1/10.36922/ijps.0339> (Accessed 15 April 2024).

Siddiqui, S., Wasif, R., Hughes, M., Parlberg, A. and Noor, Z. 2022. *Muslim American Zakat Report 2022*. Available: <https://scholarworks.indianapolis.iu.edu/items/fd27565f-6738-4d43-a3ad-173a122c617a> (Accessed 12 December 2022).

Sider, R. J. and Unruh, H. R. 2004. Typology of religious characteristics of social service and educational organizations and programs. *Nonprofit and voluntary sector quarterly*, 33 (1): 109–134. Available: <https://journals.sagepub.com/doi/abs/10.1177/0899764003257494> (Accessed 14 June 2024).

Sindall, R., Mecrow, T., Queiroga, A. C., Boyer, C., Koon, W. and Peden, A. E. 2022. Drowning risk and climate change: A state-of-the-art review. *Injury Prevention*, 28 (2): 185–191. Available: <https://injuryprevention.bmj.com/content/28/2/185.abstract> (Accessed 7 May 2025).

Singh, S. and Wassenaar, D. R. 2016. Contextualising the role of the gatekeeper in social science research. *South African Journal of Bioethics and Law*, 9 (1): 42–46. Available: <https://www.ajol.info/index.php/sajbl/article/view/138158> (Accessed 12 June 2022).

Sirris, S., Espedal, G., Jelstad Løvaas, B. and Wæraas, A. 2023. *Researching values: methodological approaches for understanding values work in organisations and leadership*. Cham: Springer Nature. Available: <https://library.oapen.org/handle/20.500.12657/53343> (Accessed 11 November 2023).

Snyder, H. 2019. Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104: 333–339. Available: <https://www.sciencedirect.com/science/article/pii/S0148296319304564> (Accessed 7 August 2022).

Sobhaninia, S. 2023. Does social cohesion accelerate the recovery rate in communities impacted by environmental disasters in Puerto Rico? An analysis of a community survey. *Environmental Advances*, 13: 100400. Available: <https://www.sciencedirect.com/science/article/pii/S2666765723000601> (Accessed 9 December 2023).

Soetanto, R. and Proverbs, D. G. 2004. Impact of flood characteristics on damage caused to UK domestic properties: the perceptions of building surveyors. *Structural Survey*, 22 (2): 95–104. Available: <https://scispace.com/pdf/impact-of-flood-characteristics-on-damage-caused-to-uk-c1c252optq.pdf> (Accessed 2 June 2022).

Sohrabizadeh, S., Jahangiri, K. and Khani Jazani, R. 2018. Religiosity, gender, and natural disasters: a qualitative study of disaster-stricken regions in Iran. *Journal of Religion and Health*, 57 (3): 807–820. Available:

<https://link.springer.com/article/10.1007/s10943-017-0398-9> (Accessed 12 May 2025).

Sojobi, A. O. and Zayed, T. 2022. Impact of sewer overflow on public health: A comprehensive scientometric analysis and systematic review. *Environmental Research*, 203: 111609. Available:

<https://www.sciencedirect.com/science/article/pii/S0013935121009038> (Accessed 20 March 2023).

Song, C., Atun, F., Blanford, J. I. and Anthonj, C. 2025. Impact of flooding on the social and mental health of older adults-A scoping review. *Water Security*. Available: <https://www.sciencedirect.com/science/article/pii/S2468312425000045> (Accessed 8 April 2025).

Sonpaveerawong, N. G., Limmun, W. and Chuwichian, N. 2019. Prevalence of psychological distress and mental health problems among the survivors in the flash floods and landslide in Southern Thailand. *Walailak Journal of Science and Technology (WJST)*, 16 (4): 255–264. Available:

<https://wjst.wu.ac.th/index.php/wjst/article/view/4017> (Accessed 26 March 2024).

Sopha, B. and Asih, A. 2019. Identifying aid items of survival kit for natural disasters. *IOP Conference Series: Materials Science and Engineering*. IOP Publishing, 012073. Available: <https://iopscience.iop.org/article/10.1088/1757-899X/673/1/012073/meta> (Accessed 7 August 2022).

South Africa, Department of Cooperative Governance and Traditional Affairs. 2021. *eThekweni metropolitan KZN*. Available: https://www.cogta.gov.za/ddm/wp-content/uploads/2020/07/Metro-Profile_eThekweni.pdf (Accessed 7 August 2022).

South Africa, Department of Cooperative Governance and Traditional Affairs. 2022. *Report of the ad hoc joint committee on flood disaster relief and recovery*. Available:

<https://pmg.org.za/files/221117adhocfloodsreport.pdf> (Accessed 2 February 2023).

South Africa, Department of Planning Monitoring and Evaluation. 2023. *Rapid assessment of the government's intervention on the April 2022 flood disaster in Kwazulu-Natal, Eastern Cape and North West March 2023 Evaluation Report 31 March*. Available: <https://www.dpme.gov.za/keyfocusareas/evaluationsSite/Evaluation%20Reports/2.4%20Final%20Report%20on%20Rapid%20Assessment%20of%20Flood%20Disaster%20Interventions.pdf> (Accessed 12 December 2023).

South Africa, Department of Public Enterprises. 2022. *Recovery of Transnet infrastructure from KZN floods: Progress report*. Available: https://pmg.org.za/files/220811DPE_Presentation.pdf (Accessed 7 September 2022).

South African Government. 2022a. *President Cyril Ramaphosa: Declaration of a national state of disaster to respond to widespread flooding*. SAnews.gov: Available: <https://www.gov.za/news/speeches/president-cyril-ramaphosa-declaration-national-state-disaster-respond-widespread> (Accessed 6 June 2022).

South African Government. 2022b. *Damage to KZN companies estimated at R7 billion*. SAnew.gov: Available: <https://www.sanews.gov.za/south-africa/damage-kzn-companies-estimated-r7-billion> (Accessed 8 August 2022).

South African Government. 2022c. *National State of Disaster-In-Numbers – 18 April 2022*. Available: <https://www.gov.za/news/national-state-disaster-numbers-%E2%80%93-18-april-2022-18-apr-2022> (Accessed 8 July 2022).

South African Weather Services. 2025. *Warnings*. Available: <http://weathersa.co.za/home/warnings> (Accessed 2 May 2024).

Spencer, G. and Thompson, J. 2024. Children and young people's perspectives on disasters – Mental health, agency and vulnerability: A scoping review. *International Journal of Disaster Risk Reduction*, 108: 104495. Available:

<https://doi.org/10.1016/j.ijdr.2024.104495> (Accessed 26 September 2024).

Stack, R. J. and Meredith, A. 2017. The impact of financial hardship on single parents: An exploration of the journey from social distress to seeking help. *Journal of Family and Economic Issues*, 39: 233–242. Available: <https://link.springer.com/article/10.1007/s10834-017-9551-6> (Accessed 24 October 2024).

Stahl, N. A. and King, J. R. 2020. Expanding approaches for research: Understanding and using trustworthiness in qualitative research. *Journal of Developmental Education*, 44 (1): 26–28. Available: <https://www.jstor.org/stable/45381095> (Accessed 19 September 2022).

Statistics South Africa. 2011. *Census 2011*. Available: <https://census2011.adrianfrith.com/place/599161017> (Accessed 12 June 2022).

Statistics South Africa. 2015. *An overview of the non-profit sector in South Africa*. Available: <http://www.statssa.gov.za/?p=4176> (Accessed 9 September 2022).

Statistics South Africa. 2016. *2016 Community Survey*. Available: https://cs2016.statssa.gov.za/wp-content/uploads/2016/07/NT-30-06-2016-RELEASE-for-CS-2016-_Statistical-releas_1-July-2016.pdf (Accessed 12 August 2022).

Statistics South Africa. 2022. *Statistical release*. Available: https://census.statssa.gov.za/assets/documents/2022/P03014_Census_2022_Statistical_Release.pdf (Accessed 3 March 2023).

Statistics South Africa. 2024. *General household survey*. Available: <https://www.statssa.gov.za/publications/P0318/P03182024.pdf> (Accessed 2 February 2025).

Statistics South Africa. 2025. *Urbanization from 2013 to 2023*. Available:

<https://www.statista.com/statistics/455931/urbanization-in-south-africa/> (Accessed 18 March 2025).

Stratton, S. J. 2024. Purposeful sampling: Advantages and pitfalls. *Prehospital and Disaster Medicine*, 39 (2): 121–122. Available: <https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine/article/purposeful-sampling-advantages-and-pitfalls/7915F1727F04A3051245959ACBA61C06> (Accessed 2 February 2025).

Suhr, F. and Steinert, J. I. 2022. Epidemiology of floods in sub-Saharan Africa: A systematic review of health outcomes. *BMC public health*, 22 (1): 268. Available: <https://link.springer.com/article/10.1186/s12889-022-12584-4> (Accessed 4 March 2023).

Sulmasy, D. P. 2002. A biopsychosocial-spiritual model for the care of patients at the end of life. *The Gerontologist*, 42 (suppl_3): 24–33. Available: https://academic.oup.com/gerontologist/article-abstract/42/suppl_3/24/56921310.1093/ (Accessed 3 February 2025).

Sunarti, E., Gunawan, E., Widiyantoro, S., Marliyani, G. I. and Ida, R. 2021. Critical point on housing construction, resilience and family subjective welfare after disaster: Notes from the Lombok, Indonesia, earthquake sequence of July-August 2018. *Geomatics, Natural Hazards and Risk*, 12 (1): 922–938. Available: <https://www.tandfonline.com/doi/abs/10.1080/19475705.2021.1910576> (Accessed 7 May 2025).

Sunohara, D., Miura, T., Komatsu, T., Hashizume, N., Momose, T., Kono, T., Motoki, H., Mochidome, T., Kasai, T. and Kuwahara, K. 2021. Relationship between the flood disaster caused by the Reiwa first year east Japan typhoon and cardiovascular and cerebrovascular events in Nagano City: The SAVE trial. *Journal of Cardiology*, 78 (5): 447–455. Available: <https://www.sciencedirect.com/science/article/pii/S0914508721001532> (Accessed 7 July 2022).

Sutherland, C. 2024. *The direct and indirect climate change impacts, loss and damages in selected at-risk communities in Durban as a result of the April 2022 floods*. Available: <https://cer.org.za/wp-content/uploads/2024/03/CER-Report-Sutherland-FINAL-28-Feb-2024.pdf> (Accessed 29 August 2024).

Sutherland, C., Scott, D. and Hordijk, M. 2015. Urban water governance for more inclusive development: A reflection on the 'waterscapes' of Durban, South Africa. *The European Journal of Development Research*, 27 (4): 488–504. Available: <https://link.springer.com/article/10.1057/ejdr.2015.49> (Accessed 25 May 2022).

Svetlana, D., Radovan, D. and Ján, D. 2015. The economic impact of floods and their importance in different regions of the world with emphasis on Europe. *Procedia Economics and Finance*, 34: 649–655. Available: <https://www.sciencedirect.com/science/article/pii/S2212567115016810> (Accessed 22 May 2022).

Tabari, H. 2020. Climate change impact on flood and extreme precipitation increases with water availability. *Scientific reports*, 10 (1): 13768. Available: <https://www.nature.com/articles/s41598-020-70816-2> (Accessed 2 June 2022).

Tadesse, G., Andualem, F., Rtbey, G., Nakie, G., Takelle, G. M., Molla, A., Abate, A. T., Kibralew, G., Kelebie, M., Fentahun, S. and Tinsae, T. 2024. Gender-based violence and its determinants among refugees and internally displaced women in Africa: systematic review and meta-analysis. *BMC Public Health*, 24 (1): 2851. Available: [10.1186/s12889-024-20329-8](https://doi.org/10.1186/s12889-024-20329-8) (Accessed 23 January 2025).

Taherdoost, H. 2016. Sampling methods in research methodology; how to choose a sampling technique for research. *International Journal of Academic Research in management (IJARM)*, 5. Available: <https://hal.science/hal-02546796/> (Accessed 19 July 2022).

Taherdoost, H. 2022. Data collection methods and tools for research; A step-by-step

guide to choose data collection technique for academic and business research projects. *International Journal of Academic Research in Management (IJARM)*, 10 (1): 10–38. Available: <https://hal.science/Hal-03741847/> (Accessed 22 May 2022).

Tanoue, M., Taguchi, R., Nakata, S., Watanabe, S., Fujimori, S. and Hirabayashi, Y. 2020. Estimation of direct and indirect economic losses caused by a flood with long-lasting inundation: Application to the 2011 Thailand flood. *Water Resources Research*, 56 (5): e2019WR026092. Available: <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2019WR026092> (Accessed 9 August 2022).

Tasri, E. S., Karimi, K. and Muslim, I. 2022. The effect of economic variables on natural disasters and the impact of disasters on economic variables. *Heliyon*, 8 (1). Available: [https://www.cell.com/heliyon/fulltext/S2405-8440\(21\)02781-X](https://www.cell.com/heliyon/fulltext/S2405-8440(21)02781-X) (Accessed 6 April 2023).

Taukeni, S., Chitiyo, G., Chitiyo, M., Asino, I. and Shipena, G. 2016. Post-traumatic stress disorder amongst children aged 8-18 affected by the 2011 Northern-Namibia floods. *Jàmbá: Journal of Disaster Risk Studies*, 8 (2): 1–6. Available: <https://journals.co.za/doi/abs/10.4102/jamba.v8i2.169> (Accessed 22 May 2022).

Taylor, Z. E. and Kaplan, J. 2023. *Mental health in displaced child and youth populations: A developmental and family systems lens*. Italy: UNICEF Innocenti – Global office of Research and Foresight. Available: <https://www.unicef.org/innocenti/media/3741/file/UNICEF-Mental-Health-Displacement-2023.pdf> (Accessed 25 June 2024).

Tellman, B., Sullivan, J. A., Kuhn, C., Kettner, A. J., Doyle, C. S., Brakenridge, G. R., Erickson, T. A. and Slayback, D. A. 2021. Satellite imaging reveals increased proportion of population exposed to floods. *Nature*, 596 (7870): 80–86. Available: [10.1038/s41586-021-03695-w](https://doi.org/10.1038/s41586-021-03695-w) (Accessed 5 April 2022).

Tenny, S., Brannan, J. M. and Brannan, G. D. 2022. *Qualitative study*. Treasure

Island (FL): StatPearls Publishing. Available:
<https://europepmc.org/books/nbk470395> (Accessed 8 September 2022).

Thakur, H. 2021. *Research methodology in social sciences (A Short Manual)*. New Delhi: Corvete. Available:
https://books.google.com/books/about/Research_Methodology_in_Social_Sciences.html?id=GlqrgzEACAAJ (Accessed 6 July 2022).

Thinane, J. S., Masuku, M. T. and Baloyi, E. 2023. Responsible public theology on climate change devastations: Disastrous flooding in KwaZulu-Natal, South Africa. *Pharos Journal of Theology*, 104 (4). Available:
<https://www.academia.edu/download/105741466/Article.pdf> (Accessed 6 April 2025).

Thoithi, W., Blamey, R. C. and Reason, C. J. 2022. April 2022 Floods over East Coast South Africa: Interactions between a mesoscale convective system and a coastal meso-low. *Atmosphere*, 14 (1): 78. Available: <https://www.mdpi.com/2073-4433/14/1/78> (Accessed 25 June 2023).

Thomas, J. J., Prakash, B., Kulkarni, P. and Murthy, M. N. 2019. Prevalence and severity of depression among people residing in flood affected areas of Kerala. *International Journal of Community Medicine and Public Health*, 6 (3): 1143–1146. Available: <https://www.academia.edu/download/109942725/2849.pdf> (Accessed 2 December 2024).

Thompson, K., Trigg, J. and Smith, B. 2017. Animal ownership among vulnerable populations in regional South Australia: Implications for natural disaster preparedness and resilience. *Journal of Public Health Management and Practice*, 1-5. Available: <https://pubmed.ncbi.nlm.nih.gov/27598703/> (Accessed 8 August 2023).

Thompson-Assan, S., Ayebea Agwadze, G. and Kakraba Kaitoo, D. 2023. Integrated first-level psychosocial response to disasters in low- and middle-income countries. *Counselling and Psychotherapy Research*, 24 (2): 390–395. Available:
<https://doi.org/10.1002/capr.12668> (Accessed 4 August 2023).

Thurston, A. M., Stöckl, H. and Ranganathan, M. 2021. Natural hazards, disasters and violence against women and girls: A global mixed-methods systematic review. *BMJ global health*, 6 (4): e004377. Available:

<https://gh.bmj.com/content/6/4/e004377.abstract> (Accessed 9 September 2022).

Thwala, S., Masiya, T. and Lubinga, S. N. 2023. Contribution of the informal sector towards sustainable livelihoods: Evidence from Khayelitsha Township, Cape Town. *International Journal of Sociology and Social Policy*, 43 (13/14): 90–105. Available: <https://www.emerald.com/insight/content/doi/10.1108/ijssp-11-2022-0289/full/html> (Accessed 6 June 2023).

Tian, X.L. and Guan, X. 2015. The impact of Hurricane Katrina on students' behavioral disorder: A difference-in-difference analysis. *International Journal of Environmental Research and Public Health*, 12 (5): 5540–5560. Available: <https://www.mdpi.com/1660-4601/12/5/5540> (Accessed 5 May 2022).

Tillermuir, H., Carboni, L., Hotchin, C., Lal, H. and Morrison, R. 2025. A holistic framework to improve urban flood management in cities with informal settlements. *Environmental Research: Infrastructure and Sustainability*, 5 (1): 015026. Available: <https://iopscience.iop.org/article/10.1088/2634-4505/adc32f/meta> (Accessed 3 June 2025).

Tirivangasi, H. M. 2018. Regional disaster risk management strategies for food security: Probing Southern African development community channels for influencing national policy. *Jàmbá: Journal of Disaster Risk Studies*, 10 (1): 1–7. Available: <https://journals.co.za/doi/abs/10.4102/jamba.v10i1.468> (Accessed 26 May 2022).

Tischer, C., Chen, C.-M. and Heinrich, J. 2011. Association between domestic mould and mould components, and asthma and allergy in children: A systematic review. *European Respiratory Journal*, 38 (4): 812–824. Available: <https://publications.ersnet.org/content/erj/38/4/812.abstract> (Accessed 20 June 2022).

Tomaszewski, L. E., Zarestky, J. and Gonzalez, E. 2020. Planning qualitative research: Design and decision making for new researchers. *International Journal of Qualitative Methods*, 19: 1609406920967174. Available: <https://journals.sagepub.com/doi/abs/10.1177/1609406920967174> (Accessed 3 March 2022).

Toomey, A. H. 2009. Empowerment and disempowerment in community development practice: Eight roles practitioners play. *Community Development Journal*, 46 (2): 181–195. Available: <https://academic.oup.com/cdj/article-abstract/46/2/181/294172> (Accessed 12 June 2022).

Tuncer, E., Kavgaoglu, D., Anilgan, O. Z. and Akinlar, A. 2024. Disaster capitalism and social policy: Social work in the aftermath of natural disasters. *Capitalism Nature Socialism*, 36 (2): 131–150. Available: <https://www.tandfonline.com/doi/abs/10.1080/10455752.2024.2377350> (Accessed 2 March 2025).

Turesson, K., Pettersson, A., de Herve, M. d. G., Gustavsson, J., Haas, J., Koivisto, J., Karagiorgos, K. and Nyberg, L. 2024. The human dimension of vulnerability: A scoping review of the Nordic literature on factors for social vulnerability to climate risks. *International Journal of Disaster Risk Reduction*, 100: 104190. Available: <https://www.sciencedirect.com/science/article/pii/S2212420923006702> (Accessed 9 January 2025).

Turnbull, M. 2025. *Malcolm Turnbull quotes*. Available: <https://quotefancy.com/malcolm-turnbulle-quotes> (Accessed 7 March 2023).

Turner, D. P. 2020. Sampling Methods in Research Design. *Headache: The Journal of Head and Face Pain*, 60 (1). Available: <https://headachejournal.onlinelibrary.wiley.com/doi/full/10.1111/head.13707#accessDenialLayout> (Accessed 12 August 2022).

Turok, I. 2015. Informal settlements: Poverty traps or ladders to work? *Econ 3x3*, 12

August. Available: <https://www.econ3x3.org/article/informal-settlements-poverty-traps-or-ladders-work> (Accessed 4 April 2022).

Twimukye, A., Nabukenya, S., Kawuma, A. N., Bayigga, J., Nakijoba, R., Asiimwe, S. P., Byenume, F., Ojara, F. W. and Waitt, C. 2024. 'Some parts of the consent form are written using complex scientific language': Community perspectives on informed consent for research with pregnant and lactating mothers in Uganda. *BMC medical ethics*, 25 (1): 149. Available: <https://link.springer.com/article/10.1186/s12910-024-01147-4> (Accessed 12 December 2024).

Udo, F. and Naidu, M. 2023. Assessing local government's response to black women's vulnerability and adaptation to the impacts of floods in the context of intersectionality: The case of eThekweni metropolitan municipality, South Africa. *Environmental Policy and Governance*, 34 (1): 31–41. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/eet.2053> (Accessed 17 January 2025).

Ugwu, C. N. and Eze, V. H. 2023. Qualitative research. *IDOSR Journal of Computer and Applied Sciences*, 8 (1): 20–35. Available: <https://www.idosr.org/wp-content/uploads/2023/01/IDOSR-JCAS-8120-35-2023.docx.pdf> (Accessed 3 December 2023).

Ullah, W., Haijun, D., Shah, A. A., Alotaibi, B. A. and Rauf, A. 2024. Behind the floodwaters: Violence against women, and disaster management capacities in flood-affected areas of Pakistan. *Climate Risk Management*, 46: 100653. Available: <https://www.sciencedirect.com/science/article/pii/S2212096324000706> (Accessed 27 March 2025).

United Nations. 2020. *Human cost of natural disasters*. Available: https://www.preventionweb.net/files/74124_humancostofdisasters20002019reportu.pdf (Accessed 12 April 2022).

United Nations. 2021. Climate change leads to more extreme weather, but early

warnings save lives. *UN Climate Change News*, 1 September. Available: <https://unfccc.int/news/climate-change-leads-to-more-extreme-weather-but-early-warnings-save-lives> (Accessed 9 July 2022).

United Nations. 2022. *Sustainable Development Goals Report 2022*. New York: United Nations. Available: <https://digitallibrary.un.org/record/3980029?ln=en&v=pdf> (Accessed 8 July 2024).

United Nations Office for Disaster Risk Reduction. 2017a. *The Sendai framework terminology on disaster risk reduction. "Disaster"*. Available: <https://www.undrr.org/terminology/disaster> (Accessed 7 May 2022).

United Nations Office for Disaster Risk Reduction. 2017b. *The Sendai framework terminology on disaster risk reduction. "Vulnerability"*. Available: <https://www.undrr.org/terminology/vulnerability>. (Accessed 29 May 2022).

Valladares-Garrido, M. J., Zapata-Castro, L. E., Domínguez-Troncos, H., García-Vicente, A., León-Figueroa, D. A., Zila-Velasque, J. P., Grados-Espinoza, P., Astudillo-Rueda, D., Peralta, C. I. and Díaz-Vélez, C. 2022. Mental health disturbance after a major earthquake in northern Peru: A preliminary, cross-sectional study. *International Journal of Environmental Research and Public Health*, 19 (14): 8357. Available: <https://www.mdpi.com/1660-4601/19/14/8357> (Accessed 12 May 2023).

Van Brown, B. L. 2019. Conflict or consensus? Re-examining crime and disaster. *Jàmbá: Journal of Disaster Risk Studies*, 11 (1): 1–4. Available: <https://journals.co.za/doi/abs/10.4102/jamba.v11i1.744> (Accessed 9 August 2022).

Van der Velden, P. G., Kleber, R. J., Fournier, M., Grievink, L., Drogendijk, A. and Gersons, B. P. 2007. The association between dispositional optimism and mental health problems among disaster victims and a comparison group: A prospective study. *Journal of Affective Disorders*, 102 (1-3): 35–45. Available: <https://www.sciencedirect.com/science/article/pii/S0165032706005337> (Accessed 23

October 2023).

Van Straten, A. and Ncube, A. 2023. Assessing the spiritual and mental health of the KwaZulu-Natal flood disaster survivors. *Jàmbá: Journal of Disaster Risk Studies*, 15 (1): 1–5. Available: https://www.scielo.org.za/scielo.php?pid=S1996-14212023000100031&script=sci_arttext (Accessed 4 November 2024).

Veeravalli, S., Chereni, S., Sliuzas, R., Flacke, J. and Maarseveen, M. 2022. Factors influencing flood damage mitigation among micro and small businesses in Kampala, Uganda. *International Journal of Disaster Risk Reduction*, 82: 103315. Available: <https://www.sciencedirect.com/science/article/pii/S2212420922005349> (Accessed 24 October 2023).

Verma, N., Dhiman, B., Singh, V., Kaur, J., Guleria, S. and Singh, T. 2024. Exploring the global landscape of work-life balance research: A bibliometric and thematic analysis. *Heliyon*, 10 (11): e31662. Available: <https://pubmed.ncbi.nlm.nih.gov/38828335/> (Accessed 8 February 2022).

Vestby, J., Schutte, S., Tollefsen, A. F. and Buhaug, H. 2024. Societal determinants of flood-induced displacement. *Proceedings of the National Academy of Sciences*, 121 (3): e2206188120. Available: <https://www.pnas.org/doi/abs/10.1073/pnas.2206188120> (Accessed 18 January 2024).

Vidal, J. 2024. Resilience in the face of Crisis: A multi-dimensional analysis of community and church roles in disaster preparedness and response. *Science and Technology Education*, 1-27. Available: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4721014 (Accessed 2 February 2025).

Vonderlin, R., Biermann, M., Bohus, M. and Lyssenko, L. 2020. Mindfulness-based programs in the workplace: A meta-analysis of randomized controlled trials. *Mindfulness*, 11: 1579–1598. Available:

<https://link.springer.com/article/10.1007/s12671-020-01328-3> (Accessed 2 March 2024).

Waddell, S. L., Jayaweera, D. T., Mirsaeidi, M., Beier, J. C. and Kumar, N. 2021. Perspectives on the health effects of hurricanes: A review and challenges. *International Journal of Environmental Research and Public Health*, 18 (5): 2756. Available: <https://www.mdpi.com/1660-4601/18/5/2756> (Accessed 22 May 2022).

Wade, D. T. and Halligan, P. W. 2017. The biopsychosocial model of illness: A model whose time has come. *Clinical Rehabilitation*, 31 (8): 995–1004. Available: <https://pubmed.ncbi.nlm.nih.gov/28730890/> (Accessed 23 February 2025).

Wahid, H., Ghazi, M. and Lashari, A. 2023. Impact of meditation on the level of post-traumatic stress in flood victims of Sindh. *Global Educational Studies Review*, 8 (8): 272–278. Available: https://www.researchgate.net/publication/371640699_Impact_of_Meditation_on_the_Level_of_Post-traumatic_Stress_in_Flood_Victims_of_Sindh (Accessed 2 December 2023).

Walker, A., McKune, A., Ferguson, S., Pyne, D. B. and Rattray, B. 2016. Chronic occupational exposures can influence the rate of PTSD and depressive disorders in first responders and military personnel. *Extreme Physiology & Medicine*, 5 (1): 8. Available: [10.1186/s13728-016-0049-x](https://doi.org/10.1186/s13728-016-0049-x) (Accessed 20 April 2022).

Wang, M. and Yin, X. 2022. Construction and maintenance of urban underground infrastructure with digital technologies. *Automation in Construction*, 141: 104464. Available: <https://www.sciencedirect.com/science/article/abs/pii/S2212420924001213> (Accessed 15 June 2024).

Wang, P., Asare, E. O., Pitzer, V. E., Dubrow, R. and Chen, K. 2023. Floods and diarrhea risk in young children in low-and middle-income countries. *JAMA pediatrics*, 177 (11): 1206–1214. Available:

<https://jamanetwork.com/journals/jamapediatrics/article-abstract/2810093> (Accessed 5 March 2024).

Wang, W., Foutz, N. Z. and Gao, G. 2022. Huddling with families after disaster: Human resilience and social disparity. *Plos one*, 17 (9): e0273307. Available: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0273307> (Accessed 23 November 2024).

Wang, Y., Josephs, H., Duan, Z. and Gong, J. 2024. The impact of electrical hazards from overhead power lines on urban search and rescue operations during extreme flood events. *International Journal of Disaster Risk Reduction*, 104: 104359. Available: <https://www.sciencedirect.com/science/article/pii/S0926580522003375> (Accessed 16 January 2025).

Wani, S. M., Suhaff, A. A., Khan, A. W. and Teli, B. A. 2020. Prevalence of depression and anxiety symptoms in people affected by flood in Kashmir. *International Journal of Health Science Research*, 10 (6): 24–29. Available: https://www.ijhsr.org/IJHSR_Vol.10_Issue.6_June2020/4.pdf (Accessed 25 May 2022).

Wanner, G. K. and Loyd, J. W. 2022. *EMS Care Teams in Disaster Response*. Treasure Island (FL): StatPearls Publishing. Available: <https://www.ncbi.nlm.nih.gov/sites/books/n/statpearls/article-31662/> (Accessed 4 February 2023).

Waseem, M. and Manshadi, S. D. 2020. Electricity grid resilience amid various natural disasters: Challenges and solutions. *The Electricity Journal*, 33 (10): 106864. Available: <https://doi.org/10.1016/j.tej.2020.106864> (Accessed 5 March 2022).

Week, D. A. and Wizer, C. H. 2020. Effects of flood on food security, livelihood and socio-economic characteristics in the flood-prone areas of the core Niger Delta, Nigeria. *Asian Journal of Geographical Research*, 3 (1): 1–17. Available https://www.researchgate.net/publication/338605154_Effects_of_Flood_on_Food_Security_Livelihood_and_Socio-economic_Characteristics_in_the_Flood-

prone_Areas_of_the_Core_Niger_Delta_Nigeria (Accessed 12 May 2022).

Whittaker, J., McLennan, B. and Handmer, J. 2015. A review of informal volunteerism in emergencies and disasters: Definition, opportunities and challenges. *International Journal of Disaster Risk Reduction*, 13: 358–368. Available: <https://www.sciencedirect.com/science/article/pii/S2212420915300388> (Accessed 3 March 2023).

Whitton, S. 2018. Social recovery for the elderly: Learnings from South-West Queensland. *The Australian Journal of Emergency Management*, 33 (1): 16–17. Available: <https://search.informit.org/doi/abs/10.3316/INFORMIT.454954017246932> (Accessed 9 September 2022).

Wiles, R. 2013. *What are qualitative research ethics?* London: Bloomsbury Academic. Available: <https://library.oapen.org/handle/20.500.12657/58724> (Accessed 17 June 2022).

Williams, D. S., Máñez Costa, M., Sutherland, C., Celliers, L. and Scheffran, J. 2019. Vulnerability of informal settlements in the context of rapid urbanization and climate change. *Environment and Urbanization*, 31 (1): 157–176. Available: <https://journals.sagepub.com/doi/abs/10.1177/0956247818819694> (Accessed 9 July 2022).

Willie, M. M. 2024. Population and target population in research methodology. *Golden Ratio of Social Science and Education*, 4 (1): 75–79. Available: <https://www.goldenratio.id/index.php/grsse/article/view/405/303> (Accessed 12 November 2024).

Wilson, Z. and Pfaff, B. 2008. Religious, philosophical and environmentalist perspectives on potable wastewater reuse in Durban, South Africa. *Desalination*, 228 (1-3): 1–9. Available: <https://www.sciencedirect.com/science/article/pii/S0011916408002282> (Accessed 19 June 2022).

Wind, T. R. and Komproue, I. H. 2012. The mechanisms that associate community social capital with post-disaster mental health: A multilevel model. *Social Science & Medicine*, 75 (9): 1715–1720. Available: <https://www.sciencedirect.com/science/article/pii/S0277953612005448> (Accessed 19 July 2022).

Witt, A., Sachser, C. and Fegert, J. M. 2022. Scoping review on trauma and recovery in youth after natural disasters: What Europe can learn from natural disasters around the world. *European Child & Adolescent Psychiatry*, 33 (3): 651–665. Available: <https://link.springer.com/article/10.1007/s00787-022-01983-y> (Accessed 7 May 2025).

Witting, A. B., Barrow, B. H., Lambert, J., Whiting, J., Hartshorn, R., Marks, L., Wickrama, T. and Thanigaseelan, S. 2020. We have lost our lives already': Loss and coping among Sri Lankan women. *Journal of Aggression, Maltreatment & Trauma*, 29: 1222–1243. Available: <https://www.tandfonline.com/doi/full/10.1080/10926771.2020.1759746> (Accessed 7 January 2023).

Woodhall-Melnik, J. and Grogan, C. 2019. Perceptions of mental health and wellbeing following residential displacement and damage from the 2018 St. John River Flood. *International Journal of Environmental Research and Public health*, 16 (21): 4174. Available: <https://www.mdpi.com/1660-4601/16/21/4174> (Accessed 20 April 2022).

World bank. 2024. *Disaster risk management and gender*. Washington, D.C.: International Bank for Reconstruction and Development. Available: <https://openknowledge.worldbank.org/entities/publication/005e3d0b-dede-4dc2-ac1a-1908970082fb> (Accessed 2 March 2025).

World health organisation. 2006. *Communicable diseases following natural disasters*. Available: <https://www.who.int/publications/i/item/communicable-diseases-following-natural-disasters> (Accessed 22 May 2022).

World health organisation. 2022. *Floods*. Available: https://www.who.int/health-topics/floods#tab=tab_1 (Accessed 20 May 2022).

World Health Organisation. 2024. *Global status report on drowning prevention 2024*. Available: <https://www.who.int/teams/social-determinants-of-health/safety-and-mobility/global-report-on-drowning-prevention> (Accessed 8 November 2024).

World Meteorological Organisation. 2021. *WMO Atlas of mortality and economic losses from weather, climate and water extremes (1970–2019)*. Available: <https://library.wmo.int/records/item/57564-wmo-atlas-of-mortality-and-economic-losses-from-weather-climate-and-water-extremes-1970-2019#.Yd1UZxPMJZ0> (Accessed 18 September 2022).

World Meteorological Organisation. 2022. *Water*. Available: <https://wmo.int/topics/water> (Accessed 21 June 2022).

Wu, S., Zhang, R., Wang, C. and Feng, D. 2022. The impact of natural disasters on rural household wealth: Micro evidence from China. *Frontiers in Environmental Science*, 10: 993722. Available: <https://www.frontiersin.org/articles/10.3389/fenvs.2022.993722/full> (Accessed 23 January 2023).

Wüthrich-Grossenbacher, U. 2024. The need to widen the concept of health and to include the spiritual dimension. *International Journal of Public Health*, 69: 1606648. Available: <https://www.ssph-journal.org/journals/international-journal-of-public-health/articles/10.3389/ijph.2024.1606648/full> (Accessed 10 June 2024).

Xu, W., Okada, N., Takeuchi, Y. and Kajitani, Y. 2007. A diagnosis model for disaster shelter planning from the viewpoint of local people-case study of Nagata Ward in Kobe City, Hyogo Prefecture, Japan. 50 (B): 233–239. Available: <https://repository.kulib.kyoto-u.ac.jp/dspace/handle/2433/73330> (Accessed 23 June 2023).

Xu, Y., Liu-Zeng, J., Allen, M. B., Zhang, W. and Du, P. 2021. Landslides of the 1920 Haiyuan earthquake, Northern China. *Landslides*, 18: 935–953. Available: <https://link.springer.com/article/10.1007/s10346-020-01512-5> (Accessed 9 September 2022).

Yamaoka-Tojo, M. and Tojo, T. 2024. Prevention of natural disaster-induced cardiovascular diseases. *Journal of Clinical Medicine*, 13 (4): 1004. Available: <https://www.mdpi.com/2077-0383/13/4/1004> (Accessed 6 November 2024).

Yang, X., Yao, Y., Tian, K., Jiang, W., Xing, Q., Yang, J. and Liu, C. 2023. Disaster response strategies of governments and social organizations: From the perspective of infrastructure damage and asymmetric resource dependence. *Heliyon*, 9(10): e20432. Available: <https://www.sciencedirect.com/science/article/pii/S2405844023076405> (Accessed 8 March 2024).

Yang, Z., Huang, W., McKenzie, J. E., Yu, P., Ju, K., Wu, Y., Wen, B., Guo, Y. and Li, S. 2024. Mortality and morbidity risks associated with floods: A systematic review and meta-analysis. *Environmental Research*, 265: 120263. Available: <https://www.sciencedirect.com/science/article/pii/S0013935124021704> (Accessed 2 December 2024).

Ye, M., Ward, P. J., Bloemendaal, N., Nirandjan, S. and Koks, E. E. 2024. Risk of tropical cyclones and floods to power grids in Southeast and East Asia. *International Journal of Disaster Risk Science*, 15 (4): 494–507. Available: <https://link.springer.com/article/10.1007/s13753-024-00573-7> (Accessed 2 May 2025).

Yesufu, S. 2025. Housing crisis in South Africa: Shack dwellers, giving a voice to the down below underclass. *International Journal of Social Science Research and Review*, 8(1): 252-264. Available: <https://ijssrr.com/journal/article/view/2525> (Accessed 30 March 2025).

Yin, R. K. 2016. *Qualitative research from start to finish*. New York: Guilford publications. Available: <https://eli.johogo.com/Class/Qualitative%20Research.pdf> (Accessed 19 July 2023).

Yodsuban, P. and Nuntaboot, K. 2021. Community-based flood disaster management for older adults in southern of Thailand: A qualitative study. *International Journal of Nursing Sciences*, 8 (4): 409–417. Available: <https://www.sciencedirect.com/science/article/pii/S2352013221000892> (Accessed 3 May 2025).

Yong, W. K., Husin, M. M. and Kamarudin, S. 2021. Understanding research paradigms: A scientific guide. *Journal of Contemporary Issues in Business and Government*, 27(2): 5857-5865. Available: https://www.researchgate.net/publication/369670077_Understanding_Research_Paradigms_A_Scientific_Guide (Accessed 7 August 2022).

Yousuf, J., Mehmood, H., Aquil, S., Rija, A., Rahmat, Z. and Malikzai, A. 2023. Effect of floods on mental health of Pakistanis: A commentary. *Annals of Medicine & Surgery*. Publish ahead of print (5). Available: https://www.researchgate.net/publication/370196537_Effect_of_floods_on_mental_health_of_pakistanis_a_commentary (Accessed 9 December 2023).

Yuka, K., Kozo, T., Kiyomi, S., Kotaro, O., Ryohei, S., Nobuyuki, T., Mamoru, S., Atsushi, S. and Makoto, S. 2022. Association between social isolation and total mortality after the great East Japan earthquake in Jwate Prefecture: Findings from the TMM CommCohort study. *International Journal of Environmental Research and Public Health*, 19 (7): 4343. Available: <https://www.mdpi.com/1660-4601/19/7/4343> (Accessed 23 December 2022).

Yulianto, E., Yusanta, D. A., Utari, P. and Satyawan, I. A. 2021. Community adaptation and action during the emergency response phase: Case study of natural disasters in Palu, Indonesia. *International Journal of Disaster Risk Reduction*, 65: 102557. Available:

<https://www.sciencedirect.com/science/article/pii/S2212420921005185> (Accessed 8 August 2022).

Zacher, M., Raker, E. J., Arcaya, M. C., Lowe, S. R., Rhodes, J. and Waters, M. C. 2021. Physical health symptoms and Hurricane Katrina: Individual trajectories of development and recovery more than a decade after the storm. *American Journal of Public Health*, 111 (1): 127–135. Available:

<https://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2020.305955> (Accessed 5 July 2022).

Zapf, M. K. 2010. *Social work and the environment: Understanding people and place*. Toronto: Canadian Scholars' Press. Available:

<https://books.google.com/books?hl=en&lr=&id=LuF71mNltJEC&oi=fnd&pg=PP1&ots=88zA7QJxLs&sig=8brE6q9Yemweo3zE7eFR1wEk9aA> (Accessed 25 May 2022).

Zehra, D., Mbatha, S., Campos, L. C., Queface, A., Beleza, A., Cavoli, C., Achuthan, K. and Parikh, P. 2019. Rapid flood risk assessment of informal urban settlements in Maputo, Mozambique: The case of Maxaquene A. *International Journal of Disaster Risk Reduction*, 40: 101270. Available:

<https://www.sciencedirect.com/science/article/pii/S2212420919301098> (Accessed 19 July 2022).

Zenker, M.L., Bubeck, P. and Thieken, A. H. 2024. Always on my mind: Indications of post-traumatic stress disorder among those affected by the 2021 flood event in the Ahr valley, Germany. *Natural Hazards and Earth System Sciences*, 24 (8): 2837–2856. Available: <https://nhess.copernicus.org/articles/24/2837/2024/> (Accessed 24 February 2025).

Zerbo, A., Delgado, R. C. and González, P. A. 2020. Vulnerability and everyday health risks of urban informal settlements in Sub-Saharan Africa. *Global Health Journal*, 4 (2): 46–50. Available:

<https://www.sciencedirect.com/science/article/pii/S241464472030021X> (Accessed 26 September 2022).

Zhang, R., Zhang, Y. and Dai, Z. 2022. Impact of natural disasters on mental health: A cross-sectional study based on the 2014 China family panel survey. *International Journal of Environmental Research and Public Health*, 19 (5): 2511. Available: <https://www.mdpi.com/1660-4601/19/5/2511> (Accessed 7 December 2022).

Zhang, Z. and Zhang, P. 2023. The long-term impact of natural disasters on human capital: Evidence from the 1975 Zhumadian flood. *International Journal of Disaster Risk Reduction*, 91: 103671. Available: <https://www.sciencedirect.com/science/article/pii/S2212420923001516> (Accessed 21 January 2024).

Zhong, S., Yang, L., Toloo, S., Wang, Z., Tong, S., Sun, X., Crompton, D., FitzGerald, G. and Huang, C. 2018. The long-term physical and psychological health impacts of flooding: A systematic mapping. *Science of the Total Environment*, 626: 165–194. Available: <https://www.sciencedirect.com/science/article/abs/pii/S0048969718300494> (Accessed 8 January 2024).

Zhou, X., Guo, J., Lu, G., Chen, C., Xie, Z., Liu, J. and Zhang, C. 2020. Effects of mindfulness-based stress reduction on anxiety symptoms in young people: A systematic review and meta-analysis. *Psychiatry Research*, 289: 113002. Available: <https://www.sciencedirect.com/science/article/pii/S0165178119317482> (Accessed 23 March 2023).

Zhu, X. and Sun, B. 2018. Recognising and promoting the unique capacities of the elderly. *International Journal of Emergency Management*, 14 (2): 137–151. Available: <https://www.inderscienceonline.com/doi/abs/10.1504/IJEM.2018.090883> (Accessed 9 September 2022).

Zondi, N. 2022. Looking back on the April floods damage, eThekweni mayor speaks of progress. *IOL news*. Available: <https://iol.co.za/dailynews/news/2023-04-12-looking-back-on-the-april-floods-damage-ethekweni-mayor-speaks-of-progress/>

(Accessed 7 March 2023).

Zorn, M. 2018. Natural disasters and less developed countries. In: Pelc, S., Koderman, M. eds. *Nature, tourism and ethnicity as drivers of (de) marginalization: Insights to marginality from perspective of sustainability and development*. Cham: Springer. Available: https://doi.org/10.1007/978-3-319-59002-8_4 (Accessed 12 June 2022).

APPENDICES

Appendix 1a: Letter of information in English – Participants from the Community



LETTER OF INFORMATION: SAMPLE 1-2-3

Title of the Research Study: A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal.

Principal Investigator/s/researcher: Vikesh Singh (MPH)

Co-Investigator/s/supervisor/s: Prof. R. Bhagwan (PhD) Community and development disciplines

Brief Introduction and Purpose of the Study:

Greeting Good Day, I trust you have been well.

Introduce yourself to the participant I am a PhD. student at DUT doing research for my PhD: Health Sciences)

Invitation to the potential participant I would like to invite you to participate in the research study.

What is Research (Research is a systematic search or enquiry for generalized new knowledge)

Your participation in the study will be of value to add to current research. Your participation in the study is voluntary, you are not forced to participate, and you are free to withdraw from the study at any point. You may ask as many questions as you like. A consent form will be provided to indicate you agree to participate in the study, however you are not obligated to continue with the interview if you are not comfortable.

Outline of the Procedures: The study aims to explore the effects that the April 2022 floods had on the individual, families and communities in the eThekweni district in KwaZulu-Natal, South Africa. This study will help with understanding the physical and psychological effects of the flood and the reconstruction of family and community life post this natural disaster.

As part of data collection for the study, semi-structured interviews will be conducted to collect the required information. Each interview is expected to last between 45 minutes to 1 hour. Participants are expected to share their experiences, insights and perspectives on the research topic.

Questions will also be asked to assist participants in sharing the required information and to guide the participants. Participants who qualify for the study are those that were affected by the April 2022 floods. The interviews will be conducted either face to face or through digital/virtual mediums of communication. The interviews will be recorded on a tape recorder to gather all information that is being shared (this will be done only after receiving the consent of the interviewees). These recordings will be handled with utmost confidentiality. The participant's only responsibility will be to be present on time for the interview and to share as much information as possible on the questions and topics discussed.

Risks or Discomforts to the Participant: There will be no risk or discomfort to the participant.

Explain to the participant the reasons he/she may be withdraw from the Study: You are entitled to withdraw from the study at any time should you wish to do so if you are not comfortable.

Benefits: There will be no direct benefit to you, however, your experiences and ideas will be a valuable contribution to the research. The results of the study will be published in accredited journals.

Remuneration: There will be no remuneration for participating in the study (i.e., no payment).

Costs of the Study: Participants are not expected to cover any costs towards this study.

Confidentiality: All information discussed/disclosed in the interviews will be noted as anonymous. Your identities will not be revealed for the purposes of confidentiality. The taped recordings will be stored in a safety vault. No person will have access to the recordings other than the researcher. The results of the study including personal details will be anonymously processed into a study report.

Results: the results of the study will be converted into a research report, and accredited publications.

Research-related Injury: (What will happen should there be a research-related injury or adverse reaction? Will there be any compensation? A disclosure of any appropriate alternative procedures or courses of treatment, if any, that might be advantageous to the participant)

Storage of all electronic and hard copies including tape recordings Data transcripts and recordings will be stored in a locked vault that only the researcher and supervisor has access to. After 5 years the transcripts will be shredded and electronic recording will be deleted permanently, the device (USB) will be destroyed.

Persons to contact in the Event of Any Problems or Queries: (Prof. Bhagwan) Please contact the researcher (0845958256, my supervisor (tel no. 031 373 2197) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za

Appendix 1b: Letter of information in isiZulu – Participants from the community



INCWADI YOLWAZI: ISIBONISO 1-2-3

Isihloko Socwano: Uphenyo lohlobo lwekhwalithi ekwazini umthelela enyameni nakusimo-ngqondo nenhlalo ngenxa yezikhukhula ezenzeka ngoMbasu ku 2022 emndenini nasemiphakathini yaseThekwini esifundazweni ikwaZulu-Natali.

Umcwani: Vikesh Singh (MPH)

Abahloli Bocwano: Solwazi. R. Bhagwan (PhD) Community and development disciplines

Isingeniso Kafuphi Kanye Nenjongo Yocwano:

Isibingelelo: Sawubona, ngiyethemba ukahle.

Zazise Kobambe Iqhaza: Ngiyisitshudeni esenza ucwano lwe-PhD emkhakheni wesayensi yezempilo.

Isimemo Songahle Ebambe Iqhaza: Ngingathanda ubambe iqhaza kulolucwano.

Luyini Ucwano (Ucwano luyinhlobo yophenyo ukuthola ulwazi olusha). Ukubamba kwakho iqhaza kuyoba yigugu kulolucwano. Lokhu kubamba iqhaza kusuka ekuthandeni kwakho, awuphoqiwe, futhi ungahoxa noma inini mawuthanda. Uvumelekile ukubuza imibuzo oyithandayo. Ifomu lokuvuma ukubamba iqhaza kulolucwano uzonikezwa lona, kepha lokho akusho ukuphoqekeka ukuqhubeka noma ungasathandi.

Incazelo Ngohlelo: Lolucwaningo lumayelana nokwazi kabanzi umthelela ezibenawo izikhukhula kumuntu ngamunye, emindenini nasemiphakathini eyakhele iTheku esifundazweni ikwaZulu-Natali eNingizimu Afrika. Lolucwaningo luzosiza ukuba kuqondeke umonakalo obangwe yilezi zikhukhula ezimpilweni futhi nasekwakhiweni kabusha kwemindenini nemiphakathi ngemva kwalesi siqameko.

Masekuqoqwa ulwazi lwakolucwaningo, kuyosetshenziswa uhlobo lwengxoxo elawulwa ngokungaphelele. Ingxoxo ngayinye ilindeleke ithathe imizuzu engamashumi amane nanhlano (45) kuya ehoreni linye (1). Ababambe iqhaza balindeleke ukuxoxa ngemizwa yabo mayelana nesihloko salolucwaningo.

Imibuzo izobuzwa ukusiza ababambe iqhaza bephendule. Ilabo abathinteka ngezikhukhula zangoMbaso ku 2022 kuphela abafanelekile ukubamba iqhaza. Izingxoxo zizoba umlomo nomlomo okanye kusetshenziswe izindlela zokuxhumana emoyeni. Izingxoxo zizoqoshwa ngethephu futhi zizogcinwa njengemfihlo ephezulu. Ababambe iqhaza bazoba nesibopho since, okungkuba babe khona ngesikhathi sezingxoxo.

Izingozi noma Ukungaphatheki Kahle Kobambe Iqhazao: Azikho Izingozi ezilindelekile.

Chaza Kobambe Iqhaza Izizathu Engahoxa Ngazo Kulolucwaningo: Uvumelekile ukuhoxa mawufuna noma usuzizwa ungakhululekile.

Inzuzo: Ayikho inzuzo eqonde kuwe siqu, kepha, ulwazi kuzoba yigugu kulolucwaningo. Imiphumela izosatshalaliswa emaphepheni asemthethweni.

Ukuholelwa: Awukho umholo ozowuthola.

Izindleko Zocwaningo: Azikho izindleko okubhekeke ukuba uzikhokhe.

Ukugcinwa Ngemfihlo: Lonke ulwazi olutholakele, luzothathwa njengolutholwe kubantu abangaziwa. Ubuwena angeke buvezwe. Okuqoshiwe kuygcinwa endaweni esesithe nephephile. Akekho omunye oyakufinyelela kulo ngaphandle komcwaningi. Imiphumela, kufaka phakathi Iminigwane yabantu ngabanye iyokwenziwa okutholwe yucwaningo.

Imiphumela: Imiphumela izokwenziwa okutholwe yucwaningo futhi isatshalaliswe emaphepheni asemthethweni.

Ukuhlukumezeka Ocwaningweni: Akukho kuhlukumezeka okulindelwe.

Ukugcinwa Kokuqoshiwe: Konke olutholakele kuzogcinwa esithe lapho kufinyelela khona umcwaningi nabahloli bocwaningo kuphela. Kobese kusulwa unomphelo ngemva kweminyaka emihlanu (5).

Abangathintwa Makunezinkinga noma Imibuzo: (Solvazi. Bhagwan) Thinta umcwaningi (0845958256, umhloli (inombolo yocingo. 031 373 2197) noma uMhleli wemiGomo yoCwaningo esiKhungweni ku 031 373 2375. Izikhalazo zingabikwa kuMqondisi wokusekelwa koCwaningo neZiqu eziphakeme Dokotela. L Langaniso ku 031 373 2577 noma researchdirector@dut.ac.za

Appendix 2: Letter of information – Participants from the faith based organisations



LETTER OF INFORMATION: SAMPLE 4

Title of the Research Study: A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal.

Principal Investigator/s/researcher: Vikesh Singh (MPH)

Co-Investigator/s/supervisor/s: Prof. R. Bhagwan (PhD) Community and development disciplines

Brief Introduction and Purpose of the Study:

Greeting Good Day, I trust you have been well.

Introduce yourself to the participant I am a PhD. student at DUT doing research for my PhD: Health Sciences)

Invitation to the potential participant I would like to invite you to participate in the research study.

What is Research (Research is a systematic search or enquiry for generalized new knowledge)

Your participation in the study will be of value to add to current research. Your participation in the study is voluntary, you are not forced to participate, and you are free to withdraw from the study at any point. You may ask as many questions as you like. A consent form will be provided to indicate you agree to participate in the study, however you are not obligated to continue with the interview if you are not comfortable.

Outline of the Procedures: The study aims to explore the effects that the April 2022 floods had on the individual, families and communities and understand to how faith-based organizations supported families and communities during this natural disaster, in the eThekweni district in KwaZulu-Natal, South Africa. This study will help with understanding the physical and psychological sequelae of the flood and the reconstruction of family and community life post this natural disaster and the role played by faith-based organisations during this period.

As part of data collection for the study, semi-structured interviews will be conducted to collect the required information. Each interview is expected to last between 45 minutes to 1 hour. Participants are expected to share their experiences, insights and perspectives on the research topic.

Questions will also be asked to assist participants in sharing the required information and to guide the participants. Participants who qualify for the study are leaders and representatives from faith-based organisations that provided humanitarian aid to the communities during the April 2022 floods. The interviews will be conducted either face to face or through digital/virtual mediums of communication. The interviews will be recorded on a tape recorder to gather all information that is being shared (this will be done only after receiving the consent of the interviewees). These recordings will be handled with utmost confidentiality. The participants only responsibility will be to be present on time for the interview and to share as much information as possible on the questions and topics discussed.

Risks or Discomforts to the Participant: There will be no risk or discomfort to the participant.

Explain to the participant the reasons he/she may be withdraw from the Study: You are entitled to withdraw from the study at any time should you wish to do so if you are not comfortable.

Benefits: There will be no direct benefit to you, however, your experiences and ideas will be a valuable contribution to the research. The results of the study will be published in accredited journals.

Remuneration: There will be no remuneration for participating in the study (i.e., no payment).

Costs of the Study: Participants are not expected to cover any costs towards this study.

Confidentiality: All information discussed/disclosed in the interviews will be noted as anonymous. Your identities will not be revealed for the purposes of confidentiality. The taped recordings will be stored in a safety vault. No person will have access to the recordings other than the researcher. The results of the study including personal details will be anonymously processed into a study report.

Results: the results of the study will be converted into a research report, and accredited publications.

Research-related Injury: (What will happen should there be a research-related injury or adverse reaction? Will there be any compensation? A disclosure of any appropriate alternative procedures or courses of treatment, if any, that might be advantageous to the participant)

Storage of all electronic and hard copies including tape recordings Data transcripts and recordings will be stored in a locked vault that only the researcher and supervisor has access to. After 5 years the transcripts will be shredded and electronic recording will be deleted permanently, the device (USB) will be destroyed.

Persons to contact in the Event of Any Problems or Queries: (Prof. Bhagwan) Please contact the researcher (0845958256, my supervisor (Tel no. 031 373 2197) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za

Appendix 3a: Letter of Consent in English – Participants from the community



CONSENT

Full Title of the Study: A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal.

Names of Researcher/s: Mr Vikesh Singh

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher (Mr Vikesh Singh), about the nature, conduct, benefits and risks of the study-Research Ethics Clearance number: _____
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant

Date

Time

Signature/Right Thumbprint

I, Mr Vikesh Singh, confirm that the above participant has been fully informed about the nature, conduct and risks of the proposed study.

Full Name of Researcher

Date

Signature

Full Name of Witness (If applicable)

Date

Signature

Full Name of Legal Guardian (If applicable)

Date

Signature

Appendix 3b: Letter of consent in isiZulu – Participants from the community



ISIVUMO

Isihloko Socwango: Uphenyo lohlobo lwekhwalithi ekwazini umthelela enyameni nakusimo-ngqondo nenhlalo ngenxa yezikhukhula ezenzeka ngoMbasa ku 2022 emndenini nasemiphakathini yaseThekwini esifundazweni ikwaZulu-Natali.

Amagama Omcwangingi: Mr Vikesh Singh

Isitatimende sesivunelwano sokubamba iqhaza kulolucwango:

- Ngiyakuqinisekisa ungazisile umcwangingi (Mr Vikesh Singh) ngesimo, inqubo, inzuzo kanye nezingozi zalolucwango -Inombolo yokusulwa emiGomeni yoCwango:.....
- Ngiphinde ngathola, ngafunda ngaphinde ngaqonda incwadi yolwazi engenhla mayelana nocwango.
- Ngiyazi ukuthi imiphumela yocwango okufaka phakathi ubulili, ubudala, neminye imininingwane izosatshalaliswa njengeyomuntu ongaziwa.
- Kokudingekayo kulolucwango, ngiyavuma ukuthi umcwangingi uzosebenza ngolwazi olutholakele ngesimo sekhompuyutha.
- Noma inini, ngingahoxa kulolucwango.
- Ngibe nesikhathi esanele sokubuza imibuzo (ethandwa yimi) ngakho ke ngikulungele ukubamba iqhaza kulolucwango.
- Ngiyaqonda ukuthi okusha okutholakele kulolucwango okumayelana nokubamba kwami iqhaza ngizonikezwa khona

Igama Eligcwele Lobambe Iqhaza Usuku

Isikhathi

Isayini/Isithupha sokudla

Mina, Mr Vikesh Singh, ngiyakuqinisekisa longenhla ibambe iqhaza wazisiwe ngesimo, inqubo Kanye nezingozi zalolucwango oluhlongoziwe.

Igama Eligcwele Lomcwangingi

Usuku

Isayini

Igama Eligcwele Likafakazi (mefuneka)

Usuku

Isayini

Igama Eligcwele Logade Ingane (mayefuneka) Usuku

Isayini

Appendix 4: Letter of consent – Participants from the faith based organisation



CONSENT

Full Title of the Study: A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal.

Names of Researcher/s: Mr Vikesh Singh

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher (Mr Vikesh Singh), about the nature, conduct, benefits and risks of the study-Research Ethics Clearance number: _____
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant

Date

Time

Signature/Right Thumbprint

I, Mr Vikesh Singh, confirm that the above participant has been fully informed about the nature, conduct and risks of the proposed study.

Full Name of Researcher

Date

Signature

Full Name of Witness (If applicable)

Date

Signature

Full Name of Legal Guardian (If applicable)

Date

Signature

Appendix 5a: Letter to the gatekeeper: Lamontville

The Ward Councilor

Mr S Ngema

Lamontville

Durban

4001

SUB: Request for permission to conduct research

Dear Mr Ngema

My name is Vikesh Singh, a Doctoral student, in Health Sciences, at the Durban University of Technology. The research I wish to conduct for my Doctoral thesis involves a qualitative inquiry on the physical and psycho-social effects of the 2022 April floods on families and communities in eThekweni, KwaZulu-Natal.

This will be a qualitative study which will require interviews with people that were affected by the floods as well as leaders of faith-based organisations that provided humanitarian aid to the communities during the flood. I am hereby seeking your consent to conduct these interviews with the people in your ward to collect the necessary data for my study.

My proposal will be attached so that you have an idea of what the study is about. I also will provide a letter of information and informed consent upon data collection, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

Should you wish to have any additional information; you may please reach me on my cell number: 0845958356 or through email at: 'vs2313@gmail.com'.

Thank you for your time and consideration in this matter.

Yours sincerely

Mr Vikesh Singh

PhD Scholar

Department of Community Health Studies

Durban University of Technology

Appendix 5b: Letter to the gatekeeper: Tongaat

The Ward Councilor

Mr Thobekani Nene

Office 10, Sizakala Cenrre

325 Main Road

Tongaat

Durban

4001

SUB: Request for permission to conduct research

Dear Mr Nene

My name is Vikesh Singh, a PhD: Health Sciences student at the Durban University of Technology. The research I wish to conduct for my Doctoral thesis involves a qualitative inquiry on the physical and psycho-social effects of the 2022 April floods on families and communities in eThekweni, KwaZulu-Natal.

This will be a qualitative study which will require interviews with people that were affected by the floods as well as leaders of faith-based organisations that provided humanitarian aid to the communities during the flood. I am hereby seeking your consent to conduct these interviews with the people in your ward to collect the necessary data for my study.

My proposal will be attached so that you have an idea of what the study is about. I also will provide a letter of information and informed consent upon data collection, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

Should you wish to have any additional information; you may please reach me on my cell number: 0845958356 or through email at: 'vs2313@gmail.com'.

Thank you for your time and consideration in this matter.

Yours sincerely

Mr Vikesh Singh

PhD Scholar

Department of Community Health Studies

Durban University of Technology

Appendix 5c: Letter to the gatekeeper: Crossmoor Informal Settlement

The Ward Councilor
Cllr. Fatima Ismail
Crossmore Informal Settlement
Ward 71
Durban
4001

SUB: Request for permission to conduct research

Dear Cllr. Ismail

My name is Vikesh Singh, a PhD: Health Sciences student at the Durban University of Technology. The research I wish to conduct for my Doctoral thesis involves a qualitative inquiry on the physical and psycho-social effects of the 2022 April floods on families and communities in eThekwin, KwaZulu-Natal.

This will be a qualitative study which will require interviews with people that were affected by the floods as well as leaders of faith-based organisations that provided humanitarian aid to the communities during the flood. I am hereby seeking your consent to conduct these interviews with the people in your ward residing in the informal settlement to collect the necessary data for my study.

My proposal will be attached so that you have an idea of what the study is about. I also will provide a letter of information and informed consent upon data collection, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

Should you wish to have any additional information; you may please reach me on my cell number: 0845958356 or through email at: 'vs2313@gmail.com'.

Thank you for your time and consideration in this matter.

Yours sincerely

Mr Vikesh Singh
PhD Scholar
Department of Community Health Studies
Durban University of Technology

Appendix 5d: Letter to the gatekeeper - Christian faith based organisation

Pastor Dayson Govender
Eshcol Community Church
Clare Estate
Durban
4001

SUB: Request for permission to conduct research

Dear Pastor Govender

My name is Vikesh Singh, a PhD: Health Sciences student at the Durban University of Technology. The research I wish to conduct for my Doctoral thesis involves a qualitative inquiry on the physical and psycho-social effects of the 2022 April floods on families and communities in eThekweni, KwaZulu-Natal.

This will be a qualitative study which will require interviews with people that were affected by the floods as well as leaders of faith-based organisations that provided humanitarian aid to the communities during the flood. I am hereby seeking your consent to conduct the interviews with yourself and two other people in your organisation in order to collect the necessary data for my study.

My proposal will be attached so that you have an idea of what the study is about. I also will provide a letter of information and informed consent upon data collection, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

Should you wish to have any additional information; you may please reach me on my cell number: 0845958356 or through email at: 'vs2313@gmail.com'.

Thank you for your time and consideration in this matter.

Yours sincerely

Mr Vikesh Singh
PhD Scholar
Department of Community Health Studies
Durban University of Technology

Appendix 5e: Letter to the gatekeeper – Muslim faith based organisation

Mr Iqsaan Abbas

A Gift from the Muslims of Durban

26 Aloefield Crescent

Springfield

Durban

4001

SUB: Request for permission to conduct research

Dear Mr Iqsaan Abbas

My name is Vikesh Singh, a PhD: Health Sciences student at the Durban University of Technology. The research I wish to conduct for my Doctoral thesis involves a qualitative inquiry on the physical and psycho-social effects of the 2022 April floods on families and communities in eThekweni, KwaZulu-Natal.

This will be a qualitative study which will require interviews with people that were affected by the floods as well as leaders of faith-based organisations that provided humanitarian aid to the communities during the flood. I am hereby seeking your consent to conduct the interviews with yourself and two other people in your organisation in order to collect the necessary data for my study.

My proposal will be attached so that you have an idea of what the study is about. I also will provide a letter of information and informed consent upon data collection, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

Should you wish to have any additional information; you may please reach me on my cell number: 0845958356 or through email at: 'vs2313@gmail.com'.

Thank you for your time and consideration in this matter.

Yours sincerely

Mr Vikesh Singh

PhD Scholar

Department of Community Health Studies

Durban University of Technology

Appendix 5f: Letter to the gatekeeper: Hindu faith based organisation

Mr Kamal Maharaj
Chief Operating Officer
Vishwa Shakti NPO
Tongaat
Durban
4001

SUB: Request for permission to conduct research

Dear Mr Maharaj

My name is Vikesh Singh, a PhD: Health Sciences student at the Durban University of Technology. The research I wish to conduct for my Doctoral thesis involves a qualitative inquiry on the physical and psycho-social effects of the 2022 April floods on families and communities in eThekweni, KwaZulu-Natal.

This will be a qualitative study which will require interviews with people that were affected by the floods as well as leaders of faith-based organisations that provided humanitarian aid to the communities during the flood. I am hereby seeking your consent to conduct the interviews with yourself and two other people in your organisation in order to collect the necessary data for my study.

My proposal will be attached so that you have an idea of what the study is about. I also will provide a letter of information and informed consent upon data collection, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

Should you wish to have any additional information; you may please reach me on my cell number: 0845958356 or through email at: 'vs2313@gmail.com'.

Thank you for your time and consideration in this matter.

Yours sincerely

Mr Vikesh Singh
PhD Scholar
Department of Community Health Studies
Durban University of Technology

Appendix 6a: Interview guide in English – Participants from the community

INTERVIEW GUIDE: SAMPLE 1, Sample 2, Sample 3 (English)

SECTION A: Participant profile

1. Age (Years): _____
2. Gender (1 = Male; 2 = Female; 3 = Other): _____
3. Marital Status (1 = Single; 2 = Married; 3 = Divorced; 4 = Separated; 5 = Other): _____
4. Do you reside in an (1 = urban area; 2 = semi-rural area; 3 = informal settlement): _____
5. House Structure:

Corrugated Iron	
Brick House	
Flat	
Other (explain)	

6. Employment status:

Full time Employment	
Part time Employment	
Self employed	
Unemployed	
Retired	
Student	

7. Source of income and number of dependents:

Salary	
Allowance	
Grant	
Other (Specify)	
Number of dependents:	

8. How long have you lived in this area?

SECTION B:

1. Can you describe how you experienced the floods in April 2022?
2. Can you share with me how it affected your family: probes: children, elderly?

3. Can you describe what personal fears and anxieties you experienced during the floods: in relation to your home, family wellbeing.
4. How did this affect you emotionally?
5. What were some of the hugest losses you experienced during the floods? Probes: loss of belongings, loss of life? How did this affect you: physically, psychologically, and socially?
6. Please share how your home and community infrastructure was affected during the floods
7. What sources of support did you receive?
8. How did your personal spiritual support systems enabled you to cope?
9. How did community organizations help you and your family, your immediate community?
10. Can you share if you were displaced from your home? Probes: where were you relocated to? And can you describe your experiences there? How did the relocation affect you and your family?
11. What do you currently need to move back to a point of normality: personally, your family and community?

Appendix 6b: Interview guide in isiZulu – Participants from the community

INTERVIEW GUIDE: SAMPLE 1, Sample 2, Sample 3 (isiZulu)

UKUQONDISWA KWENGXOXO: ISIBONISO 1, 2, 3

ISIGABA A: Imininigwane yobambe iqhaza

1. Ubudala (Iminyaka): _____
2. Ubulili (1=Weslisa; 2=Abesifazane; 3=Abanye): _____
3. Isimo somshado (1=Akashadile; 2=Bashadile; 3=Behlukamisile; 4=Abahlangene; Abanye): _____
4. Uhlala kuphi (1= Ukuphi nedolobha; 2 = Ingxenye yedolobha; 3 = Emakhaya)
5. Isimo sekhaya:

Uthayela	
Indlu yezitina	
Isikwele/iqondile	
Okunye	

6. Isimo somsebenzi

Usebenza ngokugcwele	
Uyatoha	
Uyazisebenza	
Awusebenzi	
Wathatha umhlalaphansi	
Uyisitshudeni	

7. Umthombo wemali kanye nenani labathembele kuwo:

Umholo	
Isibonelelo	
Isabelo	
Okunye (cacisa)	
Inani labathembele:	

8. Unesikhathi esingakanani uhlala kulendawo?

ISIGABA B:

1. Ungakuchaza kanjani ukufikelwa izikhukhula ngoMbasa ka 2022?
2. Awusho zawunukubeza kanjani umndeni wakho: uphenyo: izingane, abadala?
3. Ungachaza kanjani ukwesaba nokhlukumezeka emoyeni ngenxa yalezi zikhukhula: mayelana nenhlala kahle yomndeni.
4. Kwakuphazamisa kanjani emphegumulweni?
5. Yikuphi okwaba ukulahlekelwa okukhulu kakhulu ngenxa yezikhukhula? Uphenyo: ukulahlekelwa izinto zakho, ukulahleka komphefumulo? Wathinteka kanjani: enyameni, engqondweni kanye nase kuhlaleni?
6. Ngicela ungichazele ukuthi umphakathi wakho kanye nezakhiwo kwahlukumezeka kanjani ngalezi zikhukhula?
7. Hlobo luni losizo lokwesekwa owaluthola?
8. Kwakusiza kanjani okholelwa kukho ukuze ukwazi ukubhekana naleso simo?
9. Zawusiza kanjani umndeni wakho kanye neminye izinhlangano zomphakathi?

Ngiyabonga

Appendix 6c: Interview guide in English – Faith based organisations

INTERVIEW GUIDE: SAMPLE 4: FAITH BASED ORGANISATIONS

SECTION A: Participant profile

1. Designation in the organisation:
2. Age (Years):
3. Gender (1=Male; 2 = Female; 3 = Other):
4. How long have you worked with this organization?

SECTION B: Institutional profile

5. Can you please briefly share with me a little about your organization's vision, mission and key functions?
6. What is the institution's approach towards humanitarian aid?

SECTION C:

1. Describe how you as a faith leader experienced the floods personally?
2. Can you share how families and communities were affected by the floods?
3. What sort of spiritual support did you offer families?
4. What form of humanitarian relief was offered to families and communities?
5. How did your organization work to organise relief for communities?
6. How was your faith organization used as a place of shelter during the floods?
7. How did you partner with other organizations to offer families and communities support?
8. From your involvement during the floods, can you share your thoughts on whether the community receive adequate help?
9. What else do you think needed to have happened to address the situation? What other roles could key stakeholders have played: Probes: health, social services, and other relevant stakeholders?

Thank you

Appendix 7: Ethics approval (IREC)



16 January 2023

Mr V Singh
9 Howrah Road
Merebank
4052

Dear Mr Singh

A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal
Ethical Clearance number IREC 283/22

The DUT-Institutional Research Ethics Committee acknowledges receipt of your gatekeeper permission letters.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the DUT-IREC according to the DUT-IREC Standard Operating Procedures (SOP's).

Please note that any deviations from the approved proposal require the approval of the DUT-IREC as outlined in the DUT-IREC SOP's.

Yours Sincerely

Dr K Padayachy
Deputy Chairperson: DUT-IREC

Appendix 8a: Gatekeeper Approval: Lamontville

To whom it may concern

Re: Consent for Mr Vikesh Singh (22290426)

I, Mr S Ngema hereby give Mr Vikesh Singh consent to conduct the study in the Lamontville area. I am willing to recruit people for the study without compelling them to participate.

This is for his study on

A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal.

Kind regards

The Ward Councilor

Mr S Ngema, Lamontville

 wey

Permission Granted

15/12/2022

081 266 4877

Appendix 8b: Gatekeeper approval: Tongaat



Councillor

Mezzanine Floor Shell House
Cnr. Anton Lembede & Samora Marcel Street, Durban, 4001
P O Box 1014, Durban, 4000
Tel: 031 322 7020, Fax: 031 3113827
www.durban.gov.za

**Office of the Ward Councillor
eThekweni Municipality Building,
325 Gopalall Hurbans Drive,
Tongaat,
4399**

15 December 2022

To whom it May Concern

RE: CONSENT FOR MR VIKESH SINGH (22290426)

I, Ward Councillor T.H Nene hereby give Mr Vikesh Singh consent to conduct the study in Tongaat area. I am willing to recruit people for study without compelling them to participate

The study will be focused on.

A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu Natal.

Yours Faithfully,

**Cllr. T.H Nene
(031) 322 1683
(Ward 62)
eThekweni Municipality**



Appendix 8c: Gatekeeper approval: Crossmoor Informal settlement

To whom it may concern

Re: Consent for Mr Vikesh Singh (22290426)

I, Cllr. Fatima Ismail, hereby give Mr Vikesh Singh consent to conduct the study in the Informal Settlement Chatsworth area. I am willing to recruit people for the study without compelling them to participate.

This is for his study on

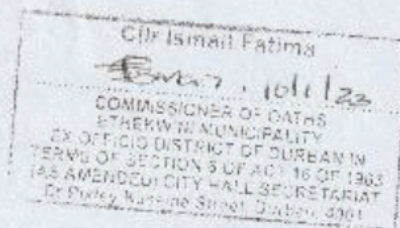
A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal.

Kind regards

Cllr. Fatima Ismail

Ward Councillor

Ward 71



Appendix 8d: Gatekeeper approval: Christian faith based organisation

**ESHCOL**
Community Church
FULL GOSPEL CHURCH OF GOD IN SOUTHERN AFRICA

1134 QUARRY
CLARE EST
DU
TEL: 031 - 269
PASTOR DAYSON GOVENDER
TEL/HOME: 031 - 401
CELL 083 427 2804
email: dayson.govender@gmail.com
P.B.O. REG. NO: 93009

PST. DAYSON GOVENDER
ESHCOL
COMMUNITY CHURCH
1134 QUARRY ROAD
CLARE ESTATE
CELL: 083 427 2804**PASTOR D. GOVENDER**
FULL GOSPEL CHURCH OF GOD
COMMISSIONER OF OATHS
MARRIAGE OFFICER
APPOINTMENT NO: BD 35199
REPUBLIC OF S.A..

Appendix 8e: Gatekeeper approval: Muslim faith based organisation

To whom it may concern

Re: Consent for Mr Vikesh Singh (22290426)

I, Mr Iqsaan Abbas hereby give Mr Vikesh Singh consent to conduct the study at A Gift from the Muslims of Durban. I am willing to recruit people for the study without compelling them to participate and participate in the study.

This is for his study on

A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal.

Kind regards



Mr I Abbas

25/12/2022

Appendix 8f: Gatekeeper approval: Hindu faith based organisation



18 December 2022

To whom it may concern

Re: Consent for Mr Vikesh Singh (Student number 22290426)

I, Mr Ram Maharaj hereby give Mr Vikesh Singh consent to conduct the study. I am willing to recruit people for the study without compelling them to participate in the study.

This is for his study on:

“A qualitative inquiry on the physical, psychological and social effects of the 2022 floods on individuals, families and communities in eThekweni, KwaZulu-Natal.”

Kind regards

Ram Maharaj (President: South African Hindu Dharma Sabha)