POOR SANITATION AND HYGIENE PRACTICES: A CASE OF EZIMANGWENI COMMUNITY IN INANDA, ETHEKWINI MUNICIPALITY IN KWAZULU-NATAL

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Dissertation submitted in compliance with the requirements for the Master's Degree in Health Sciences: Durban University of Technology.

DECLARATION

I, Zungezi Wiseman Thuthu declare that this dissertation is representative of my own work in both conception and execution (except where acknowledgements indicate to the contrary).

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DEDICATION

I DEDICATE THIS DISSERTATION TO MY FAMILY ESPECIALLY MY LATE MOTHER, NOMLUNGISO VIOLET BHAM. THANK YOU FOR YOUR CONTINUOUS SUPPORT, ENCOURAGEMENT AND LOVE. THIS DISSERTATION WOULD NOT BE POSSIBLE WITHOUT YOU.

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ABSTRACT

Purpose of the study - Access to water, proper sanitation facilities and good hygiene practices are critical in disease prevention and health in the community. The right to basic services, comprising of adequate shelter and water, are entrenched in the Republic of South Africa's Constitution (1996) with the rights to access to both basic water supply and basic sanitation required to guarantee sufficient water and an environment not harmful to health or well-being recognized in the Water Service Act of 1997.

Research Problem - In South Africa access to water, sanitation and hygiene (WASH) services, remains inadequate and inequitable in many peri-urban and rural communities. Discrimination related to rising unemployment and the remnant of Apartheid separated service delivery system resulted in unequal access to WASH services. About "50% of the world's population" live in urban and sub-urban areas, and a number of these areas have a deficiency on access to clean water and sanitation necessary for proper health and well-being.

Research Methods and Design - The study employed a quantitative study design. Descriptive cross-sectional study was conducted among households in Ezimangweni in Inanda between March and May 2021. A sample of 170 households was selected by means of the systematic random sampling strategy, where the margin of error was set at 5%. The research was aimed at assessing poor sanitation and hygiene practices in the community of Ezimangweni in Inanda, examine community knowledge related to health and hygiene practices, identify root causes for poor sanitation and assess challenges faced by community members regarding sanitation facility provided.

Findings -The research revealed that sanitation and hygiene was very poor in the study area. This is supported by local Community Health Centre reporting 100% of cases of diarrhoea reported on a monthly basis, 66.7% cases of children reporting with blood in the stool and 33.3% of children with Dysentery and 33.3% cases amongst children vomiting. This study has established a strong relationship between poor sanitation, hygiene practices and type of diseases prevalent in the study area.

Conclusion - The research has emphasised the vital role of providing sustainable WASH services to communities in order to prevent transmission of diseases and mitigate spread of water-borne illnesses.

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ABBREVIATIONS

DWAF	Department of Water Affairs and Forestry
RDP	Reconstruction and Development Programme
UNICEF	United Nations Children Fund
VIP	Ventilated Improved Pit Latrine
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation
WRC	Water Research Commission
WSA	Water Service Authority

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

Poor sanitation and hygiene practices can lead to a myriad of water-related diseases in a community. Sanitation, broadly, refers to the provision of facilities and services for safe disposal of human waste. It also refers to the upkeep of sterile conditions through establishment of services such as refuse collection and wastewater disposal (World Health Organization, accessed at http://www.who.int/ topics/sanitation). According to WHO (2021), “many people with no access to safe water source and better sanitation services are found in Asia and Africa. In Asia, 50% of the inhabitants live deprived of appropriate sanitation facilities and in Africa, two out of five do not have access to appropriate water supply (Manasi and Latha, 2017). Poor sanitation and hazardous hygiene behaviour confines the poor into a brutal cycle of poor health, environmental degradation, malnourishment, low output and loss of income. Sustainable Development Goals (SDGs) ushered in 2015 contain a devoted water and sanitation goal (Goal 6) with two targets on water, sanitation and hygiene (WASH) for the year 2030 (Yu et al, 2016).

Hygiene and personal health are closely connected to each other. Inadequate treatment or disposal of human excreta and other waste can lead to transmission and spread of diseases that originate from excreta. Poor sanitation and hygiene has been associated with diarrhoea, worm infestation, and eye and skin infections. More than 70% of the population in the Eastern and Southern Africa have no access to basic sanitation. The numbers for those who do not have access to basic hygiene services is even larger (386 million), for instance countries such as Ethiopia, Uganda, Kenya and Tanzania have the highest number of people without basis sanitation. In Malawi, 88% of the population uses pit latrines for household human waste disposal, (Chiposa, et al, 2017. The greatest concern in the region is the pace at which provision of basic services is being done, for instance, access to basic sanitation services in communities has only increased by 6% since the year 2000, projections show that only 36% of the population will be able to access basic sanitation services by 2030.

Sanitation and hygiene are very important components of good health, survival, and development. Many countries in Sub-Saharan Africa are facing challenges in providing adequate sanitation for their entire population, leaving people at risk for water, sanitation,

and hygiene- related diseases. South Africa with its numerous densely populated areas lacking piped water, proper sanitation facilities and inadequate hand washing facilities, perpetuates the transmission of sanitation related diseases. According to the South African National Sanitation Policy (2016), the domestic sanitation objective is to raise the proportion of families with access to functional sanitation from 84% in 2013 to 90% by 2019. About 13.6% of South Africans live in informal dwellings and 5.5% inn traditional dwellings (Beukes, 2019). The Free Basic Sanitation policy (FBS) was developed to ensure that the country's poorest citizens have access to hygienic excreta disposal facilities (DWAF, 2003). Legislation enacted since 1994, including the Water Services Act (1997), devolves responsibility for the provision of this service to municipalities, with infrastructure to be funded through the annual Municipal infrastructure Grant (or, more recently, the Urban Settlements Development Grant for Metro Municipalities) and operation and maintenance through the Local Government Equitable Share. (Water Services Act, 1997).

In South Africa, the proportion of people with access to an improved sanitation facility increased from 49, 3% in 1996 to 76, 8% in 2013 (Statistics South Africa, 2015). However, the portion of households that continued to live without proper sanitation facilities had been decreasing consistently between 2002 and 2016, decreasing from 12, 3% to 4, 2% during this period (Statistics South Africa, 2016). According to Salisbury, et al. 2018, "More than a million Ventilated Improved Pit latrines (VIPs) have been built in South Africa in the past 20 years". A survey of water services authorities in 2009 indicated that many of these are nearly full (Still and Foxon, 2012). Almost 12% of households in South Africa use pit toilets with ventilation pipes, while a small percentage (0, 3%) mainly used a combination of solutions that included ecological and urine diversion toilets.

Many households continue to have poor access to adequate sanitation as can be seen from the 13.7% of households that use pit toilets without ventilation pipes, 2,2% that still use some kind of bucket system, and 2,4% that had no access to sanitation (Statistics South Africa, 2016). Cities and small townships are being seen as epicentres for cholera due to poor sanitation and hygiene practices. Better-quality health is one of the main reasons for investing in hygiene and sanitation services. Access to safe water and sanitation stimulates changes in hygiene behaviour.

Durban Metropolitan covers an area of 2 297 square kilometres and a population of 3.5 million people in urban, sub-urban and rural settlements. The eThekwini Water and Sanitation unit (EWS) is charged with providing water and sanitation to the residents of EThekwini (Salisbury, et al.2018). Certain areas in the EThekwini municipality are

designated as being outside the 'waterborne edge', in that they are too far from the existing network for it to be economically viable to provide residents with waterborne sewerage. Ventilated Improved Pits have been designated as the minimum acceptable level of basic sanitation by the South African Government (DWAF, 1996). They provide a robust sanitation solution in that they can accept a range of wastes into their pits without complete failure to function, and can be used even after the superstructure (roof, walls, door, pedestal and vent pipe) has been vandalised.

The first VIP latrines were constructed in the Durban area in the 1990s. Before eThekwini Municipality changed its policy to offer only Urine Diversion Dry Toilets (UDDTs), more than 45 000 VIPs were in existence in the municipality. A serious concern was that pit latrines ceased to provide a sanitation solution when the pits were full, and this was occurring more rapidly than expected (Bhagwan et al., 2008) (Salisbury, et al. 2018). Several studies have investigated user attitudes to on-site sanitation and found widespread dissatisfaction (Duncker et al., 2006; Maharaj, 2012; Narsai et al., 2013; Roma et al., 2013). Both Maharaj (2012) and Mnguni et al. (2008) found users reluctant to empty vaults. (Salisbury, et al. 2018). The addition of solid waste to the pits shortens their useful life. If flooding occurs, pathogen risk to residents and the risk of contamination of water become greater. In a study conducted by Beukes, King and Schmidt, (2017), found the presence of Multi-Drug Resistance, Escherichia. coli strains in pit latrine samples, this demonstrate that these facilities maybe a potential source of MDR bacteria. The rate of pit-emptying proposed for UDDTs in EThekwini is yearly at present, while VIPs are emptied on a 5-year cycle. Clearing of the pit is undertaken by the municipality, at no cost to the users. In order to carry out this function efficiently, EWS made the decision to empty the pits on a planned, area by area basis rather than emptying individual pits as they become full. Ventilated Improved Pits are well-established, robust systems used by rural households for hundreds of years but under urban conditions their performance may be poorer and user acceptance is lower where there are flush toilets close by.

1.2. RESEARCH PROBLEM

The problem of inadequate sanitation and lack of good hygiene is a challenge in many sub-urban settlements in South Africa. The study will focus on Ezimangweni, a sub-urban area in Inanda, under eThekwini Municipality KwaZulu-Natal. Ezimangweni has Ventilated Improved Pit (VIP) Latrines that were installed in 1995, and these were not emptied for almost 24 years. The VIP latrines have no water connected to them thus impacting on hand

hygiene practices for the community. EThekwini Municipality provides on-site sanitation in the form of VIP latrines and Urine Diversion (UD) toilets. There are no drainage systems that pose problems relating to grey water disposal and solid waste. Solid waste is disposed into skips located in certain areas; this also poses a problem for the community, as some skips are located far from their houses. The skips are supposed to be emptied when full, but sometimes they are left for long periods and then attract scavengers, vermin, and overflow. This situation is tantamount to causing water-related diseases in the community and environmental impact.

For many years, the community of Ezimangweni has been complaining to the EThekwini Municipality about the emptying of their pit latrines for years. The municipality has been promising to empty these latrines, however, sighting challenges concerning the inaccessibility of certain household due to density and topography of the area. The research is motivated by the fact that suitable sanitation in the area is inadequate and this situation is worsened by the lack of drainage and proper solid waste removal, which also contributes to a sanitation chimera in Ezimangweni. The Constitution of the Republic of South Africa, (2016: 84), section, 152 states that "municipalities are to ensure the provision of services in communities sustainably and to promote a safe and healthy environment".

Sanitation is one of the basic services provided by municipalities. Provision of good sanitation services and health education on hand hygiene are vital components for good health and reduction of water, sanitation and hygiene-related diseases in the community. Health problems associated with poor sanitation and hygiene include diarrhoea, dysentery, typhoid, cholera, worm infestations, eye infections, and skin diseases. Provision of suitable toilets and hand washing facilities - preferably with soap - prevents the transfer of bacteria, viruses, and parasites found in human excreta which otherwise contaminate water resources, soil, and food. About 60% of the world's population does not have a lavatory at home, while one-third of schools worldwide provide no toilet facilities.

United Nations states that the world is not on track to reach Sustainable Development Goal 6, which is that everyone has a toilet by 2030. Additionally, 2.4 billion people in the world currently lack access to adequate sanitation and are forced to dispose of their excreta in unimproved and unsanitary conditions (Ekong, 2015:593). Poor sanitation is a serious issue that is affecting most parts of the world especially the developing countries. On a global scale, the most affected are children who in most cases lose their lives due to diseases caused by poor sanitation (Ekong, 2015). As from 1990, 1.2 billion people have gained access to improved sanitation in urban areas, increasing coverage from 76% in 1990 to 80%

in 2012. Nevertheless, the population without sanitation in urban areas actually increased significantly by 215 million to 756 million in 2012, due to population growth outpacing the number of people who gained access to sanitation (WHO and UNICEF, 2020).

1.3. OVERVIEW OF THE STUDY

This study will focus on assessing sanitation and hygiene practices in the community of Ezimangweni in Inanda. The study will explore community knowledge and attitude towards the type of sanitation and hygiene provided in the area of Ezimangweni. This will be done by using a questionnaire (for the community) and semi-structured interviews for the local Councilor and EThekwini municipality official in the water and sanitation unit. The health status of the residents will be evaluated by an administered questionnaire. Adequate sanitation includes the provision and use of facilities and services that safely dispose of human urine and faeces, thereby preventing contamination of the environment while hygiene relates to the practice of handwashing with soap after defecation and disposal of child faeces, prior to preparing and handling food.

Lack of good hygiene practices, such as toilet use, handwashing with soap, water treatment, food hygiene, and menstrual hygiene, and the benefits of other poverty reduction strategies will be undermined and human dignity will be compromised. The State of Hygiene in Southern Africa study was commissioned to gather evidence regarding: the status of hygiene practice in the region; the enabling environment and institutional arrangements for the promotion of hygiene behaviour change; and key policy and programme bottlenecks for the prioritization of hygiene.

1.4. STUDY SETTING

Figure 1.1: EThekwini Metropolitan Municipality (www.googlemaps.com)

The study is set in Ezimangweni, in Inanda; EThekwini municipality. Ezimangweni is a peri-urban area of Inanda, under eThekwini Metropolitan in the province of KwaZulu-Natal, South Africa. The satellite coordinates of Ezimangweni are: latitude 29°42'53"S and longitude 30°56'59"E. This area was once occupied by Indian community in eighties up until early nineties when the Indian community moved to Phoenix. Ezimangweni as part of Inanda was has been a reception area for people flocking to Durban to look for work. This attractiveness has resulted into dense population caused by influx of people who escaped poverty and violence in rural areas. The welcoming character of Inanda had to spill over to nowadays, since it was and still easy and cheap to get accommodation. This state has resulted into the area becoming the mixture of formal, and semi-rural or peri-urban settlement. In addition to its reach oral history, the place has a rich history since most of the prominent figures who are today's heroes of the struggle have their traces in the area, John Langalibalele Dube, J B Champion, Pixley kaIsaka Seme, Isiah Shembe and even Mahatma Ghandi. The area is unique from other townships because of its complex mix of urban pull and rural push factors which were contained in the apartheid policy.

Figure 1.2: Map of Ezimangweni area (www.googlemaps.com)

The main bonding factor for the people of Inanda is poverty, with the history of marginalisation being yet another. In the mid 80's the growing population of Inanda was seen as nothing other than a temporal settlement by authorities who did not seem to be having any plan to develop the area. An explanation for this neglect was that most land was privately owned and therefore landowners were reluctant to release it for compensation since they suspected that the money was going to be less. Different settlements in Inanda differ in terms of ethnic composition but principally it is predominantly Zulu speaking people followed by Xhosa speaking especially in the informal side of Inanda like at Gandhi Settlement and Amaoti. Inanda hosts the biggest township population in the province and one of the oldest black settlements in the EThekwini metropolitan municipality.

1.5. RATIONALE OF THE STUDY

Sanitation is a very important aspect of community well-being, as adequate sanitation protects human health and is documented to provide benefits to the economy. Globally, improving WASH has the potential to prevent at least 9.1% of the disease burden or 6.3% of all deaths. A report by the Black et al, 2019, suggests that higher levels of WASH services can significantly reduce diarrheal illness. Diarrhoea is associated with poor water, sanitation and hygiene (WASH) and kills more than one million people every year. Safe WASH practices have the potential to greatly reduce these statistics but behaviour change interventions in the field have yielded little success to date. Currently, there is an emphasis on addressing cognitive processes to bring about changes in behaviour, (Ginja, Gallagher

and Keenan, 2019). Single most important goal of sanitation is to safely reduce human exposure to pathogens.

Pathogens are excreted by infected individuals and if not properly contained or treated, may present a risk to humans who come in contact with them. The community can also be exposed to pathogens through drinking water or eating food contaminated with pathogens found in human excreta. A search of literature on sanitation and hygiene showed that there were very few studies conducted on sanitation and hygiene in Inanda, none in the chosen study area. There is a paucity of information on the state of sanitation and hygiene in Inanda**.** Steenkamp, 2017:328 suggests that "research is important in improving data on risk factors, understanding of comparative exposure of individuals to multiple environmental, socioeconomic and life style risks". Hence, this study will encourage policy makers to connect public health to the housing sector when undertaking urban planning.

1.6. BENEFITS OF THE STUDY

It is hoped that the findings of the research study will provide ways to improve sanitation and hygiene practices in the area of Ezimangweni. Improve water, sanitation, hygiene and solid waste service delivery to the community, through improvement of existing water, sanitation and hygiene management systems. It is also hoped that the findings will become a role model in conducting analogous research in other communities in Inanda. The findings of the study will be used to educate the community of Ezimangweni about the importance of sanitation and good hygiene in improving health and the environment. The EThekwini Municipality can use the study to come up with sustainable sanitation solutions for the municipality considering that any sanitation solution may not be suitable for all communities. The academic community may also use the study as a guide for other studies with similar circumstances.

1.7. AIM OF THE STUDY

The aim of the study is to assess poor sanitation and hygiene practices in Ezimangweni community in Inanda, EThekwini Municipality.

1.8. OBJECTIVES OF THE STUDY

1.8.1 Objectives:

- To examine the knowledge of the community regarding health and hygiene practices.
- To identify the root causes of poor sanitation in Ezimangweni.
- To assess challenges faced by the community regarding sanitation services.

- To suggest corrective measures to address sanitation problems in Ezimangweni. (the design of some sort of educational pictorial booklet/pamphlets in isiZulu)

1.8.2. Research Questions

- What is the current state of sanitation in Ezimangweni?
- What are the effects of poor sanitation on the health of the community?
- How can the situation be improved for the benefit of the community?

1.9. OUTLINE OF DISSERTATION

Table 1.1: Structure of Dissertation

Structure of Dissertation		
CHAPTER	**TITLE**	**OUTLINE**
CHAPTER ONE	Introduction to the study	Introduce and give an overview of the study by identifying the topic of inquiry, rationale, problem statement, study aims and objectives and the significance of study. Background information on occupational exposure to flour dust and the associated adverse health effects are provided to highlight the importance of the topic and justify this study.
CHAPTER TWO	Literature review	This is an analysis of the existing literature and evidence serves to inform the study's focus and design. The literature reviewed also highlights and compares the occupational exposure to flour dust from different context, such as from a Global, African and South African context.
CHAPTER THREE	Research Methodology	Provides detailed description of the study methodology with the rationale for the research design and methodological selection, implementation strategies and ethical consideration. The study population, sample, data

		analysis methods are described for the reader to appreciate the intricacies of the study designed and research findings.
CHAPTER FOUR	Presentation of the results	Statistical analysis packages present the quantitative results. Findings are captured using statistical packages and further analysed to determine relationship between flour dust exposure and the associated respiratory outcomes.
CHAPTER FIVE	Discussion	Findings are discussed in details and conclusions are reached.
CHAPTER SIX	Recommendations	Conclusions are presented. Limitations and strengths of the study are identified. Recommendations made in relation to the key findings of the study.

1.10. CONCLUSION

Poor sanitation and hygiene are key drivers of transmission of infectious diseases, and contamination of the environment. Deficiencies in WASH are major contributor to water-borne illnesses, such as Trachoma, a leading infectious cause of blindness, which is precipitated by repeated infection with bacteria that is often perpetuated by poor hygiene, (Delea, 2019). Previous research conducted in the field has helped identify factors to be considered when improving or redesigning sanitation and hygiene, however, in South Africa there is limited literature on sanitation and hygiene in peri-urban areas.

CHAPTER TWO

LITERATURE REVIEW

2.1. INTRODUCTION

Over 2 Billion people still do not have access to basic sanitation according to data released by WHO and UNICEF's Joint Monitoring Programme for Water Supply, sanitation and hygiene (WHO/UNICEF, 2019). However, 2.1 billion people gained access to decent toilets between 2000 and 2017, the statistics show how massive a scale the water, sanitation and hygiene (WASH) crisis still persists despite these efforts. Basic access still falls below the ambition of the Sustainable Development Goal 6, of everyone having access to a safely managed water supply which demands that everyone has a household service that is reliable and tested to be safe. The data also points out that huge inequalities exists within countries, for instance, Namibia has just 4 5 of its poorest people has basic access to toilets, compared to 87% of the richest people. Hygiene inequalities also exist more notable in Pakistan, where the gap is 77% between the rich and the poorest people on access to handwashing facilities with soap and water (WHO/UNICEF, 2019).

Water-borne diseases associated with unsafe water, poor sanitation and poor hygiene practices are major causes of diseases and death in resource limited countries. People living in peri-urban areas in Sub-Saharan Africa are faced by a challenge to improve sanitation, hygiene and access to safe water supplies, and there is limited information on the knowledge, attitudes and practices of households in relation to water safety, sanitation and hygiene (Abera, et al, 2018). Poor living conditions including lack of sanitation, running water and overcrowding may facilitate transmission of SARS-CoV-2. (Zar, et al, 2020). The human coronavirus disease (COVID-19) is now a global pandemic. Social distancing, hand hygiene and the use of personal protective equipment dominate the current fight against COVID-19.

In developing countries, the need for clean water provision, sanitation and hygiene has only received limited attention. Evidence shows that SARS-CoV-2 proliferates in the human gastrointestinal system, and is shed via faeces.

SARS-CoV-2 can survive and remain viable for up to 6 to 9 days on surfaces. Hence, clean drinking water provision, proper sanitation, food safety and hygiene could be critical in the current fight against COVID-19. Future research directions on COVID-19 faecal-oral transmission are highlighted (Gwenzi, 2021:1).

The Lancet Commission, 2021, reveals that Covid-19 pandemic has emphasized how limited access to WASH services undermines public health endeavours and impairs social and health benefits, (The Lancet Commission, 2021). The SDG 6 is off-track, the deficit is said to be huge, as almost half of the world's population did not have access to safely managed sanitation services in 2020, (WHO, 2019). According to UNICEF, 2020, states that "there are three main ways to meet the criteria for use of a safely managed sanitation services: i) people should use improved sanitation facilities which are not shared with other households, ii) the excreta produced must either be: treated and disposed on-site, stored temporarily and emptied and transported to treatment off-site, transported through a sewer with wastewater and then treated off-site and iii) human waste needs to be safely managed across the entire sanitation service chain". SDG sanitation target 6.2.1 is the percentage of the population using safely managed sanitation services, including a handwashing facility with soap and water. In urban areas, the full chain is required, with emptying, transport, treatment and disposal of faecal matter, while where latrines are used; pits are covered and replaced when full. Inter-related developments such as climate change, gender and income disparities, humanitarian crisis and rapid urbanisation compound the achievement of this target, (The Lancet Commission, 2021).

WASH services are gradually becoming more urgent in the context of climate change, antimicrobial resistance and rapid urban growth, as effective WASH services prevents many infectious diseases and their sequelae, reduces exposure to naturally occurring toxic chemicals and reduce pressure on public health care services. Therefore, attaining universal access to a safely managed WASH service must be contended. In contrast to water supply which met its Millennium Development Goal (MDG) in 2010, sanitation as of 2015 has failed to meet its MDG target. Worldwide, the use of improved drinking water sources increased from 1990's 76% to 2015's 91%, and four out of five people in urban areas use piped water.

Data on hand washing habits globally has become more frequently collected and indicates low usage of soap and water after contact with excreta (Hutton and Chase, 2017). Poor sanitation is linked to transmission of diseases such as diarrhoea, dysentery, hepatitis A, cholera, typhoid and worsens stunting. According to the WHO,2017, 14 % of the global population uses toilets or latrines where excreta is disposed of on- site, while 74 % uses basic sanitation services and 2.0 billion people still do not have basic sanitation facilities such as latrines or flush toilets" (World Health Organization,2017). Poor sanitation has also been linked to 432 000 diarrhoeal deaths each year and is a major factor in many neglected tropical diseases and contributes to malnutrition. Pitiable sanitation is one of the leading risk factor for child mortality worldwide. Hazards emanate from unsafe management of the toilet,

such as in excreta soiled slabs, missing covers, erosion around the pit and failure to wash hands after defecating.

2.2. GLOBAL SANITATION AND HYGIENE CRISIS

Enhanced sanitation, the practice of appropriate hygiene and use of improved sources of drinking water could prevent 2.4 million deaths (4.2% of all deaths) annually in the world (Gosh and Cairncross, 2014). Better sanitation alone could reduce diarrhoea-related morbidity by more than a third (UNICEF, 2010). Diarrhoeal is transmitted through human excreta, and it is therefore critically `*to have effective barriers in place to prevent this major transmission route. Generally, diarrhoea is the fourth leading cause of death, and claimed 2.5 and 1.4 million lives in the years 1990 and 2010 respectively. A major share of these deaths is attributable to Water, Sanitation and Hygiene (WASH). Enhancing access to safe drinking-water supplies may involve constructing or improving water supply systems or services such as provision of piped water on-site, public standpipes, boreholes, protected dug wells, protected springs or rainwater. While improvement on sanitation means, a dependable sanitation system that is designed and used to separate human excreta from human contact at all steps of the sanitation service chain from safe toilets and containment (in some systems with treatment in-situ) through conveyance (in sewers or by emptying and transport), to treatment and final disposal or end use (UNICEF, 2010).

As a family unit moves away from open defecation towards use of better sanitation services, and ultimately to safely managed systems, health benefits increase and hygiene is in-turn improved through promoting hand washing with soap at critical times (WHO, 2019). Worldwide inequalities on sanitation are disguised between regions. Virtually the entire population of the developed regions uses improved facilities, but in developing regions only around half the population uses improved sanitation. Unfortunately, it is no surprise that much ill-health is attributable to a lack of water, sanitation and hygiene. The strong focus of SDG 6 on safely managed sanitation services poses a challenge for countries to move from basic sanitation to safely managed sanitation services for all, for instance Pakistan reports 89% of access to basic sanitation and 36% of the safely managed services, while Egypt has 93% of her population with basic service and 60% safely managed services, (Bakir, et al, 2017:525). Change to an era of safely managed Wash services under SDGs direction implies the necessity of additional resource allocation to improve and sustain WASH services. The SDGs emphasize the shift to country-driven target setting, financing, implementing and monitoring, (Bakir, et al, 2017:526).

Target number 6.2 of the SDG's calls for universal access to adequate and equitable sanitation, setting a more ambitious standard for 'safely managed sanitation services. However, according to WHO,2021, "in 2020, around 1 in 4 people lacked safely managed drinking water in their homes and nearly half the world's population lacked safely managed sanitation, while 2.4 Billion people gained access to safely managed sanitation services" (WHO,2021:44). Billions of people worldwide still live without safely managed drinking water, safely managed sanitation and basic hygiene services, especially in rural areas and least developed countries; the current rates of progress need to multiply in order to reach the global target of universal access by 2030, (United Nations, 2021). In 2020, 3.6 billion people lacked safely managed services, of which approximately half (1.9 billion) had basic services. WHO, 2021, advocates that "at the onset of the Covid-19 pandemic, 3 in 10 people worldwide could not wash their hands with soap and water within their households".

Gosh and Cairncross, 2014, argues that "only 63% of the global population use improved sanitation facilities". Though promotion of safe hygiene is the single most cost-effective means of preventing infectious disease, investment in hygiene is low both in the health and in the water and sanitation sectors. Evidence shows the benefit of improved hygiene, especially for improved hand washing and safe stool disposal (Curtis et al. 2011). Improved water supplies and sanitation facilities make it easier to practise hygiene, keeping children and adults safe from infection. The financial benefits of improved sanitation include savings in health system costs, fewer days lost at work or at school through illness or through caring for an ill relative, and time savings from increased convenience (Hutton et al. 2006).

Among sanitation practices, the one that poses not only the greatest threat to human health but also an affront to human dignity is open defecation. Though the proportion of people practising open defecation is decreasing, the absolute number has remained at over 1 billion for several years, because of population growth most of them (59%) live in India (WHO/UNICEF 2012a). After the end of the United Nation's Millennium Development Goals (MDGs) in 2015, the Open Working Group of the General Assembly agreed on the Sustainable Development Goals (SDGs) post 2015. The Sustainable Development Goals have a devoted water and sanitation goal (Goal 6) with two targets on water, sanitation and hygiene (WASH) for the year 2030. The WASH programme has three core components; access and availability to water, adequate sanitation, and hygiene, grouped together due to their inter-dependent nature. WASH positively impacts a number of key resources essential for development and has been a priority on the development agenda for the last 50 years, (Mackinnon, et al, 2019: 457).

The SDGs are developed upon existing monitoring and shortcoming pre-2015. The SDGs consider water quality, reduction of inequality between different population groups, levels of service, access to basic services now consider water quality, reduction in inequalities between population groups, levels of service, access to basic services, looks on situations beyond the households such as school and healthcare centre, service sustainability and hygiene. The sanitation target of the SDG's is that everyone should have a 'safely-managed' sanitation facility by 2030 and that open defecation is eliminated, (Mara and Evans, 2017).

Sustainable Development Goal, goal number 6 stresses for a clear vision to ensure universal access to drinking water and sanitation while addressing issues pertaining to quality, supply and improving water management to protect ecosystems and build resilience. The SDGs incorporates safety, equality and echoes water and sanitation as basic human rights. Proposed post-2015 targets for international monitoring of access to water, sanitation and hygiene targets are:

- To eradicate open defecation;
- To achieve universal access to basic drinking water, sanitation and hygiene for households, schools and health facilities;
- To halve the proportion of the population without access at home to safely managed drinking water and sanitation services;
- To progressively eliminate inequality in access.

The ushering of World Health Organization's 2018-2025 strategy, (WASH), introduced a concept "to substantially improve health through the safe management of water, sanitation and hygiene services in all settings". Water, Sanitation and Hygiene (WASH) incorporated in the SDGs play a critical role in the prevention and management of Neglected Tropical Diseases (NTDs) and the prevention of transmission of soil transmitted helminths infections, schistosomiasis. WASH also critical in the prevention and care of all of the 17 neglected tropical diseases said to receive intensified control or elimination by 2020, (Chinnamma, et al, 2019). WASH also have positive effects and contribute to improving other critical areas related to public health covered by the SDGs such as nutrition, economic development, education, and climate resilience (WHO.2017:1). World Health Organization has issued a new Global Strategy and Action Plan, Water, Sanitation and Hygiene for accelerating and sustaining progress on Neglected Tropical Diseases. The strategy focuses on universal access to safely managed, sanitation and hygiene services by 2030, and on universal health coverage, as set out under the Sustainable Development Goals (Boisson et al.2016:20).

The SDG definition of basic access to handwashing with soap is, “population with a basic handwashing facility with soap and water available on premises” (Water Aid 2018:6).

Hand-washing with soap (HWWS) is one of the most cost-effective interventions to prevent top causes of under-5 mortalities in developing countries. Unsafely managed excreta harm human health overall and child health in particular. They damage the quality of air, soil, surface water, and groundwater. The sanitation target of the SDG’s is that everyone should have a ‘safely-managed' sanitation facility by 2030 and that open defecation is eliminated, (Mara and Evans, 2017). SDG goal 6 stresses for a clear vision to ensure universal access to drinking water and sanitation while addressing issues pertaining to quality, supply and improving water management to protect ecosystems and build resilience. Black and Fawcett, 2008, states that “at least 23% of the 2.6 billion people lacking adequate sanitation live in urban environments, usually in informal settlements".

The ill effects of poor sanitation access, poor sanitation and open defecation practices have serious impact on environment, health and economic ramifications on affected communities.” It is estimated that a combination of poor sanitation, water, and hygiene would lead to around 700,000 premature deaths every year, and loss of approximately 443 million school days due to consequential diseases”, (World Ban**k,** 2014).

2.3. SANITATION AND HEALTH

The lack of adequate and safe sanitation systems leads to infection and disease. Diarrhoea persists as major public health concern and a leading cause of disease and death among children under five years in low- and middle income countries (Prüss-Üstün et al. 2016). Vector- borne infections such as West Nile Virus are easily transmitted in poor sanitation conditions, (WHO, 2018). Unsanitary conditions have also been linked with stunting, which affects about a quarter of children under five years worldwide. Holmes, et a**l,** 2016, argues that “lack of safe sanitation contributes to the emergence and spread of antimicrobial resistance by increasing the risk of infectious diseases”. The increasing microbial adaption of pathogens, changing human susceptibility, climate change, changing human demographics, economic development, urbanization and breakdowns in public health, war, famine, poverty, and social inequality contribute significantly on disease outbreaks globally, (Yates, et al,2018).

This link between cleanliness and dignity is present in national political discourse. Since water is life, then sanitation is “a way of life”. Acceptable sanitation, together with good hygiene and safe water are fundamental to good health and social and economic

development, (AlpanaKateja, 2016). World Health Organization, 2008, “estimates that globally 8% of diarrhoea is linked to unsafe water, inadequate sanitation or insufficient hygiene”. According to Melariri, 2019, “Water, sanitation and hygiene (WASH) are vital indicators to healthy living and safe environments for child development”.

A study conducted by Prüss-Ustun et al. 2019:765, estimated that “829,000 water, sanitation and hygiene related deaths and 48.9 million occurred from diarrheal diseases in 2016 making 60% of all diarrheal deaths”. Inadequate water, sanitation and hygiene remain an important determinant of global disease burden, especially among young children. Sanitation services are critical for public health; their importance is reflected in SDG 6 and the associated targets 6.1, 6.2 and 6.3, (Howard, 2021). According to Howard, 2021; 438, “It has been understood that the quantity of water is as important as its quality; that levels of sanitation coverage within communities are important to reduce disease (Wolf et al. 2018); and that handwashing is critical (Mbakaya, et al. 2017). In addition to pathogens that cause infectious diseases, we have identified a range of chemicals that cause non-communicable diseases including cancers, cardiovascular diseases and diabetes” (WHO, 2017a).

Despite all the information, the burden of disease associated with inadequate water, sanitation, and hygiene (WASH) remains high, as diarrhoea related to inadequate WASH is estimated to cause nearly 300,000 deaths in children under 5 each year, (Prüss-Ustun, et al. 2019). In 2015, “2.3 billion people were lacking access to basic sanitation services (improved sanitation facility that is not shared with other households) and more than 60% were not using a safely managed sanitation service, (a sanitation facility that safely disposes excreta in-situ or that ensures that excreta are safely treated off-site” (WHO and UNICEF, 2017).

“Estimates suggest that one in four persons worldwide does not have access to a handwashing facility with soap and water on premises and that only 26% of potential faecal contacts are followed by handwashing with soap” (Wolf, et al. 2018b). In South Africa, bucket system for sanitation in many black townships has endured since the end of apartheid era, despite long-standing official targets for its eradication. Statements by politicians have emphasised the aspect of personal dignity: the previous President of South Africa stated that the government was on course to ‘put an end to this dehumanising system’ 37 and the former Minister for Water Affairs and Forestry acknowledged that the ‘bucket system can only be described as demeaning’.

Research shows that handwashing with soap can reduce diarrhoea by almost 50% and respiratory infections (including pneumonia) by almost 25% (Water Aid, 2018). Despite efforts to provide basic sanitation facilities for communities, diarrhoea remains the second leading cause of death among the under five-year-old children globally, most these deaths occur in South Asia and Sub-Saharan Africa (WHO-MCEE, 2018). Poor sanitation and hygiene practices accounts for 7% of deaths in developing countries (Orora, et al, 2017: 87). In a study conducted by Tsida et al, 2013 found that "more than 60% of the city of Kigali population resides in informal settlements, where they experience inadequate and poor quality urban services including sanitation". Lest we forget the worse Cholera Outbreak in 2008 and 2009 in Zimbabwe, the outbreak in Zimbabwe exposed the hidden and often ignored problems, including regular sewer line bursts, inadequate water supply, frequent water cuts, and perennially "dry neighbourhoods", the result in part of a shortage of purification chemicals and intermittent electricity supplies as well as ageing pipes that led to acute leakages in places" (Banana, Chitekwe-Biti and Walnycki, 2014).

WASH interventions have enabled countries such as Morocco to report reduction on prevalence of Trachoma (Boisson, et al,.2016). Studies conducted by Cairncross, et al. 2010, Waddington, et al, 2010, and Bartram, et al.2010, "indicated that most diseases are contracted in the house and the immediate surroundings". Therefore, the global burden of disease and mortality could be reduced by 9.1% and 6.3% if access to water, sanitation and hygiene is prioritised.

According to Aluko, et al. 2017, "Nigeria has the highest diarrhoea prevalence rate (18.8%) in Africa above that of the Sub-Saharan Africa average of 16%, with the exception of South Africa (69%) and Swaziland (58%), less than half of rural populations in Southern Africa countries have access to at least basic sanitation. In Madagascar, Mozambique, Namibia and Zimbabwe the proportion of rural people that practise open defecation is higher than the proportion that have access to a basic latrine, (Water Aid,2018: 5).

Sub-Saharan Africa (SSA) is one of the regions with low levels of coverage, and did not meet the MDG target, (WHO/ UNICEF Joint Water Supply and Sanitation Monitoring Programme, 201**5**). Sub-Saharan Africa and Southern Asia are the two regions that face greatest challenges on access to sanitation, as Sub-Saharan Africa (SSA) has 70% of her population have no access to enhanced sanitation, and Southern Asia with a mere 59% coverage on better sanitation (WHO/UNICEF 2012a). Tsimpo and Wodon.2018, suggests that "lack of income and affordability are the key obstacles to better hygiene and sanitation coverage in communities in Uganda". In the South of the African continent, the situation is

much worse, as the Sub-Saharan Africa (SSA) is one of the regions with the lowest level of coverage on water and sanitation. The region's population only gained 42% of improved water by 1990 (Armah**,** 2018). For instance, Nigeria with her 181 million people, only 56 million people have access to sanitation (Inabo and Arshed, 2019). Armah, (2018**)** claims that "lack of clean drinking water and adequate sanitation facilities are the world's second killer of children under five years".

Sub-Saharan Africa only increased by 20% on improving drinking water provision and 7% on improved sanitation facilities in 2015 (Armah, 2018**).** Availability of safe sanitation in low-income, informal settlements of Sub-Saharan Africa has not significantly improved since 1990. The combination of a high faecal-related disease burden and inadequate infrastructure suggests that investment in expanding sanitation access in densely populated urban slums can produce important public health gains. Lack of basic services, overcrowding and high population density, sub-standard housing and unhealthy living conditions. Are characteristics of most Sub-Saharan countries? Review and Meta-analysis studies suggests that water, sanitation, and hygiene interventions, as well as their combination, are effective at reducing poor sanitation and hygiene practices in developing countries.

The World Bank has projected that globally, current levels of financing for WASH are only sufficient to cover the capital costs of achieving basic universal water, sanitation and hygiene services by 2030. Though the proportion of the population without adequate sanitation may be lower in urban areas than in rural areas, the public health risks of unsafe excreta disposal can be much greater within a dense urban population compared with a low-density rural population where open defecation occurs largely beyond the boundaries of human habitation. On-site systems (pit latrines, septic tanks) are the most common type of sanitation in cities of low and middle income countries.

United Nation Children's Fund and World Health Organization estimates that 1.1 billion people lack access to improved water supplies and 2.6 billion people lack adequate sanitation (Moe and Rheingans, 2006). According to Mara, (2003:452), "water and sanitation needs of the poor in developing countries are huge, to meet the target for water and sanitation for all by the end of 2025, some 2.9 billion people will have to receive, improved water supplies, and 4.2 billion improved sanitation". Inadequate sanitation in peri-urban areas increases the prevalence of diseases and pollution of the environment. Therefore, the provision of sanitation and hygiene for peri-urban dwellers is important to arrest the scourge of sanitation-related diseases.

The problem of inadequate housing also poses a challenge for peri-urban communities, as it contributes to poor home hygiene, personal hygiene practices cannot be improved where there is a lack of adequate amenities such as water, wastewater disposal, solid waste management and proper housing (Nath, 2003). Nath, (2003:19), points out that "regrettably, in developing countries, public health concerns are usually raised on the institutional setting, such as municipality services, hospitals, environmental sanitation; there is a reluctance to acknowledge the home as a set of equal importance along with the public institutions in the chain of disease transmission in the community". Koner, 2018, states that "Improved sanitation considers mainly the availability of physically closer facilities, short waiting time and safer excreta disposal". South Asia, East Asia and Sub-Saharan Africa struggle with lack of access to improved sanitation, and it is no surprise to learn that many people in these regions suffer from many diseases related to poor sanitation and hygiene.

Diarrhoea, typhoid, trachoma, schistosomiasis, Hepatitis A, Hepatitis E, intestinal worms, child mortality, death during pregnancy, maternal health, menstrual hygiene, urinary infections, are associated with the inaccessibility of safe sanitation facilities. Many studies conducted by WHO, UNICEF, Water Aid, and many other international organizations have shown that sanitation related diseases mentioned above affects several African and Asian countries. Nallari, 2015, has also showed that reproductive tract infections and urinary infections can also be exacerbated by inadequate sanitation facilities.

Water, sanitation, and hygiene interventions are key to decreasing the burden of disease associated with outbreaks, and are commonly implemented in emergency responses; however, there is a lack of summarized evidence on the efficacy and effectiveness of these interventions. Roma et al, 2010:589, explains that, "typically ineffective interventions have been characterized by top-down approaches to service delivery with little consideration of recipients' demands or their participation in the planning, construction and implementation process".

2.4. SANITATION AND HYGIENE

A study by Chinnamma, (2019:60), exposes that "Meta-regression of risk estimates suggests that hand washing reduces the risk of diarrhoeal disease by 40%". Data shows that handwashing with soap can reduce diarrhoea by almost 50% and respiratory infections (including pneumonia) by almost 25%4. Access to safe water and sanitation, Sustainable Development Goal (SDG) 6, is necessary for human development, (Dickin, et al, 2021). WHO and UNICEF, (2017) argues that "adequate data on hygiene aspects globally is still

lacking as 159 million people are still collecting water directly from surface sources such as rivers, and 2.3 billion still lack basic sanitation facilities". Access to water and sanitation and sustainable management of water and sanitation aspects are essential to hygiene. Hygiene is seen as a condition of cleanliness. Hygiene is defined as a condition and practices that help to maintain good standard of health and prevent the spread of diseases, (WHO, 2020). Zerah (2000) claims that "if a person consumes less than 25 litres of water daily, it is not possible to maintain basic hygienic practices". Thara, 2017, has showed the link between the quantity of water use and level of daily hygiene, shortage of water deteriorates the quality of sanitary practices of women". Good hygiene is an important barrier to a number of infective diseases, as good hygiene promotes better health and well-being. Improving hygiene conditions benefits susceptible individuals in a community such as the elderly, children under the age of five, and members of community suffering from immunocompromised diseases like Tuberculosis and HIV/AIDS. Hygiene has been shown to reduce diarrheal diseases and assist in improving social outcomes in the community, (Potgieter and Hofman, 2019). Cleanliness is not the same as hygiene; hygiene is far more than just cleanliness as cleanliness involves the removal of dirt, waste from the surface of objects using detergents and other equipment. While hygiene practices mainly focus on the prevention of diseases through the use of cleaning as one of the several inputs, (Kumwenda, 2018).

Numerous developing countries struggle to cope with consistent water shortages and lack adequate water infrastructure. Poor hygiene causes a global health challenge in many developing countries, despite the fact that hygiene behaviour such as hand washing with soap could save lives of people annually, (Kumwenda, 2019). Hygiene can be applied in various ways to promote health and prevent disease transmission:

Personal hygiene: includes taking care of one's body and clothes as well as oral, hand, hair, mouth and menstrual hygiene.

Water hygiene involves the collection, transportation, storage, and use of water without contaminating it.

Food hygiene is the practical process of ensuring that food is fit for human consumption and prevention of contamination.

Waste handling hygiene involves solid, liquid, and gas wastes from point of generation, collection, storage, transportation, and disposal to curb contamination of the environment. Hygiene can be performed at personal, domestic and community level. Hygiene benefits can be achieved when coupled with advances in water supply, and sanitation services. Poor

hygiene may put lives of millions of people at risk from water, sanitation, and hygiene-related diseases which are preventable and already are foremost causes of death among children globally. By 2015, diarrhea was the leading cause of death among all ages, whereby, nearly half a million children died each day, as most of the diarrhea was attributed to poor water, sanitation, and hygiene practices, (Kumwenda, 2018). Systematic reviews done between 1997-2010 disclosed that hand-washing with soap reduces diarrhea by 32-48%. Kumwenda, 2018, states that, “evidence suggests that hand-washing with soap reduces the risk of diarrhea by 47%, and further proposes that hand washing with soap has been acknowledged as one of the most cost-effective health interventions to reduce the burden of diseases”. The critical times for hand washing with soap being; before cooking food, before eating food, after visiting the toilet, after cleaning or touching dirt, and after changing baby nappies (Kumwenda, 2018).

Most disease control interventions to a larger extent rely on hygiene for them to achieve their goal, (Potgieter and Hoffman, 2019). Hygiene to be effective, it need to be combined with sanitation and adequate water supply. In 2017 Global waters, placed hand-washing facilities coverage at 27% in Sub-Saharan Africa and below 50% in Africa. In 2020, WHO and UNICEF reported that 71% of global population had basic handwashing facilities with soap and water in their homes (WHO, 2021). Hand hygiene is any intervention to initiate or promote the practice of handwashing with soap or other agents after defecation, after disposal of child faeces, and prior to preparing, eating and handling food. These interventions may include initiatives to promote changes in hygiene through; group discussions, hand hygiene campaigns, leaflets, songs, dramas, and interventions providing soap or other agents to improve hygiene and/or equipment to facilitate handwashing, such as handwashing stations (Piper, et al, 2017).

WASH strategy has been introduced as a part of sustainable development goal- 6 to achieve universal, affordable and sustainable access to safe drinking water, sanitation and hygiene by 2030 (Chinnamma,2019). Correct WASH practices reflect the health status of the community. A study conducted in Indonesia found that families that did not have improved latrines had a higher likelihood of both of a child with a history of diarrhoea in the previous seven days, these findings coincided with the study conducted in Mozambique which indicated an association between lack of latrine and child mortality in Mozambique (Orora, Obiri and Ombachi, 2017).

The utmost reduction of diarrhoea is associated with pit latrines and flush toilets. A research conducted in the Republic of Congo showed that children from households that obtain water

from protected sources were less likely to have cases of diarrhoea compared to those who get it from unprotected sources (Orora, Obiri and Ombachi, 2017). The absence of access to improved toilet sanitation remains a major health and environmental hazard in developing nations in the world. The lack of access to safe excreta disposal contributes to the overall burden of diseases in developing nations in Africa and Asia that disproportionately affects children. Diarrhoea-related diseases such as dysentery, cholera, and typhoid are attributable to inadequate sanitation and hygiene are the leading cause of death among children under five years, (Njuakom, 2017).

Globally, many efforts exerted towards providing basic sanitation services to people have not been sufficient to achieve universal coverage. In developing countries worldwide, many policies, strategies, initiatives, and projects on basic sanitation have failed, despite important investments. Of the several reasons explaining the failure, it is remarkable to note that such approaches have focused mainly on improving the technology of the sanitation system without considering the human aspects, such as user preferences. Moreover, there is currently no comprehensive approach that ensures the provision of a sanitation service that users want or need to satisfy their needs, (Turrén-Cruz, García-Rodríguez, Peimbert-García and Zavala, 2020:1).

Worldwide, peri-urban areas are experiencing rapid-urbanization and conventional infrastructure development is generally slow to catch up with the constant growth in these highly populated areas, (Silveti and Anderson, 2019). Most people relocating to urban areas commonly move to peri-urban areas, and development challenges are usually overlooked in peri-urban areas due to multiple, overlying or contradictory governance systems, especially where municipal and traditional authorities coexists, (Silveti and Anderson, 2019).

2.5. SANITATION AND SOLID WASTE

Solid waste may be defined as all discarded solid materials resulting from households, industrial, healthcare, constructional, agricultural, commercial, and institutional sources. Solid waste generated in a city is often referred to as municipal solid waste, (Ziraba, et al, 2016). Sustainable Development Goals advocates for reduced generation of waste, and increased reuse and recycling. They also touch on health lives and promote wellbeing; goal number 6 (water and sanitation); Sustainable Development Goal number 11 advocates for making cities inclusive, safe, resilient and sustainable and goal number 13 emphasises combating climate change and its impact on the environment. While goal number 11 also

has a specific indicator that relates to solid waste management: "percentage of solid waste regularly collected and well managed" (Ziraba, et al, 2016).

Modern solid waste management approaches encourage reduced waste generation, re-use, recycling, composting, and safe disposal through landfills; however, these are not often practiced. In developing countries, a large proportion of waste is not re-used. According to Ziraba et al, 2016, "currently, it is projected that by 2025 there will be about 4.3 billion urban residents who on average will generate 1.42 kg of waste per day. It is known that solid waste has effects on health and it is one of the major reasons why solid waste management is a top environmental and public health issue. Orora et al 2017, argues that, "solid waste disposal is another key factor that influences diarrhoeal morbidity among children below 5 years". Open dumpsite approach in solid waste disposal is the most primitive stage of solid waste management practiced in many parts of the world. In most developing countries solid waste disposal sites are mostly on the outskirts of urban areas and are sources of contamination to children below five years due to the incubation and proliferation of flies, rodents and mosquitoes (Orora et al, 2017:88).

2.6 SOUTH AFRICAN CONTEXT

2.6.1. Sanitation Legislation in South Africa

South Africa is one of the most unequal countries in the world, and this is reflected in the access to improved sanitation. Water and sanitation policies endeavour to redress the legacy of socially unequal development and the current challenges of rapid urbanization. The Constitution of the Republic of South Africa,1996; particularly Section 27 (1)(b) guarantees everyone the right to access to sufficient water and requires the state to adopt reasonable legislative measures to progressively realize this right within the available resources. The Constitution unreservedly recognises the right to sanitation through association rights provided for in the Bill of Rights, including rights to a healthy environment, health and dignity, and in many other myriad of international statutes of which RSA is a signatory.

Water Services Act, 108 of 1997 in Section 3 construes section 27 of the Constitution by stipulating, that everyone has the right of access to water and basic sanitation, relevant state institutions must take reasonable measures to realise these rights and that relevant authorities must provide measures to realise these rights. The National Development Plan (NDP), which is considered a blueprint for the elimination of poverty and inequality, aims to address lack of equity in the provision of basic services such as water and sanitation, and

outlines strategic framework for water services in RSA. The South African constitution places the responsibility for sanitation service provision on local municipalities (district municipality or local municipality level). Statistics South Africa General Household Survey, (2017:41), reported that "through the provision and the effort of government, support agencies and existing stakeholders, an additional 20.5% of households in South Africa have access to improved sanitation since 2012".

Though there has been a notable increase in the number of people who have access to water and sanitation in post-apartheid South Africa, the number of people without access to reliable water supply and decent sanitation remains unacceptably high.

According to a survey conducted by Statistics South Africa in 2016, only 44.4% of people had access to water inside their dwelling, while 30% of households had taps within their stand and the remaining made use of communal taps and natural water sources such as rivers and dams. Water, Sanitation and hygiene services (WASH) are essential for public health and socio-economic development, however, access to WASH remains inadequate and inequitable in many rural areas and small towns, (Abrams, Carden, Teta and Wagseather, 2021). The provision and duty for water and sanitation delivery lies with local government level in South Africa (Republic of South Africa, 1998).

In most parts of South Africa's metropolitan areas, water infrastructure is well developed. According to Statistics South Africa's General Household Survey of 2018, "97.7% of the urban population in metros had access to tap water" (Statistics South Africa, 2018). However, most central areas or formerly 'white' urban areas are well-resourced with household taps and reliable access to water, while many peri-urban areas and townships, on the other hand, have formal housing with taps in the house or in the yard, but can experience water interruptions for hours or days. Some policy documents such as the "White Paper on Basic Household Sanitation of 2001, the National Strategic Framework for water services, (Water is life, Sanitation is dignity) have all advocated for an inclusive and equitable sanitation provision. The Local Government Municipal Systems Act, 32 of 2000, entrenches the duty for the delivery of basic services to all. A basic service is defined as "a municipal service that is necessary to ensure an acceptable and reasonable quality of life" and, if not provided, would endanger public health and safety or impact on the natural environment. Hence, a basic service would include access to water and sanitation.

In 2015, the National Sanitation Policy, was adopted which recognises sanitation as a public good that extends beyond the household boundary, however, the National Sanitation policy is concerning as it does not explicitly recognise sanitation as a human right to which

everyone is entitled (SAHRC, 2018.12). The National Sanitation policy rather explicitly declare the connection between sanitation, nutrition and health and acknowledges hygiene education and the importance of systematic approaches to encourage the widespread adoption of safe hygiene practices to reduce diarrhoeal and other WASH-related diseases, (Momberg, 2020:833). The Department of Water and Sanitation's responsibility in terms of the formulation and implementation of policy governing the water and sanitation sector, while striving to ensure that all South Africans gain access to clean water and dignified sanitation (National Department of Water and Sanitation, 2019). Finally, the Department of Health is concerned with improving health status through the prevention of illnesses and the promotion of healthy lifestyles (National Department of Health, 2019b). (Momberg, 2020:833).

The Free Basic Sanitation policy (FBS) was developed to ensure that the country's poorest citizens have access to hygienic excreta disposal facilities (Brouckaert, Still and Buckley, 2018:448). The introduction of the Water Services Act of 1997, shifted responsibility for the provision of sanitation services to municipalities, with infrastructure to be funded through the annual Municipal Infrastructure Grant of the Urban Settlements Development Grant for Metropolitan Municipalities) and operation and maintenance through the Local Government Equitable Share (Salisbury et al, 2018). However, South Africa's provision of sanitation lags behind access to water; hence, the government promulgated the White Paper on Basic Household Sanitation in 2001. The White paper ushered in the notion of universal access to basic sanitation by 2010, with a focus on prioritizing communities with the greatest need for sanitation services (Gounden**,** Pfaff, Macleod and Buckley, 2000).

Mara, (2003) argues that "the world is not doing well in water supply and sanitation, and consequently not well in personal and domestic hygiene". In a study by Lewin et al, 2007, and the South African Comparative Risk Assessment Collaborating Group, (2007:755), "found that 13,434 deaths were attributable to unsafe water, sanitation and hygiene (WASH) accounting to 2.6% of all dearth's in South Africa in 2000". Therefore, unsafe water, sanitation and hygiene remain a vital risk factor for disease in South Africa, especially amongst children below five years". Provision of water, sanitation, and hygiene services (WASH) is essential for public health and socio-economic development.

Satisfactory provision of water, sanitation and hygiene (WASH) facilities is a supporting pillars of healthy living (Ohwo and Agusomu, 2018: 308). The study by USAID, 2017, revealed that "open defecation was prevalent in the rural areas of Burkina Faso, Ghana and Niger, which has led to the contamination of drinking water sources, resulting in outbreaks

of diarrhoea, with children showing signs of under nutrition, malnutrition and stunting". The report also revealed that the poor state of WASH services in Niger was responsible for the prevalence of waterborne diseases, which was the cause of 14% of all childhood deaths in the country, (Ohwo and Agusomu, 2018). Children and the elderly need adequate WASH services for a healthy living. In the SSA region WASH facilities are poorly provided both in urban and in rural. Poor WASH services contribute to child mortality and morbidity, and also lead to poor school attendance, under nutrition, stunting and many other sanitations related diseases (UNICEF, 2016).

According to Abrams et al, (2021), argues that "WASH-related mandates mainly sit between the Department of Health (DoH) and the Department of Human Settlements (DHS) in South Africa. South Africa's colonial past continues to ensure access to WASH services across the country, and the legacy of unequal distribution of infrastructure and services remains a challenge. Water sanitation and hygiene provision is a complex concept, with many components, both individual factors and within each component (quality, quantity, access, infrastructure, etc.), interacting in the system, while the individual WASH components occur in different governmental spheres. According to latest South African community survey, "access to piped water has increased, but complete coverage is far from a reality, while toilet facilities have improved with 67.5% of the population accessing flush or chemical toilets, this does not suggest that these facilities are operational" (Hemson, 2016:25). Lack of formal sewage and drainage, greywater from showering/face washing, oral hygiene, clothes and bedding and dishes is normally disposed outside of the house, on the edges of the property or on the plants.

The various forms of greywater are mostly absorbed by the soil in the area but occasionally run down into low areas are sites. In this way, run-off from greywater can potentially end up pooling at water collection sites. The lack of system to dispose of effluent, greywater, black water, or storm water poses challenges for environmental hygiene; this is further complicated by the lack of organised solid waste disposal by the municipality, leaving this task to individual households. Waters of all kinds (run-off, storm water, grey water, etc.) potentially mix, and contaminants stay in the local environments. Morden South African informal settlements emerging from segregated settlement patterns imposed from the 1940s-largely lack water and sanitation infrastructure. Relatedly, South Africa has one of the highest inequality rates in the world, principally along racial lines, maintained in housing structure and location, including service delivery, (Abrams, et al,2021).

The several departments are primarily concerned with their core mandates. As such they are restricted in addressing crosscutting issues that fall outside of their immediate remit. For instance, the DoH (and/or clinicians and allied medical services) is responsible and concerned with direct/acute clinical issues and is not necessarily empowered to address the underlying and environmental causes of clinical conditions that they are confronted with. The interconnected effects of water, quality, human waste disposal, and health status, especially disease through faecal-oral route are well established, hence, improvement on water quality and sanitation confer both health and non-health benefits (Govender, Barnes and Clarissa, 2011). Misselhorn, 2008, contends that “inhabitants of informal settlements in South Africa confront challenges such as poor infrastructure, limited access to basic services and insecure tenure”.

2.6.2. EThekwini Sanitation Provision

EThekwini Municipality has been providing on-site sanitation for peri-urban and rural areas in the form of Ventilated Improved Pit latrines and Urine Diversion toilets. The city provided 700.000 households with toilets in 14 years and was the first municipality to introduce free basic water for the poor, and promoted rain harvesting and introducing Urine-diverting dry toilets. When analyzing sanitation coverage per Metropolitan in South Africa, EThekwini municipality is rated amongst the lowest, rating at 83%, (Katukiza, et al, 2012). Pit latrines persist as the main form of sanitation among the urban poor in Africa and many other developing regions, especially where unplanned or informal settlements dominate the urban landscape.

Most latrines are built on opposite side of the homestead. The reticulation system is non-existent, nor are there services to remove effluent from the pits. Refuse is not removed nor are there any bulk services for such a removal; often, waste is burned at individual homestead. Sustainability with reference to sanitation implies that the system needs to comprise of collection, storage, transport, and treatment of human excreta, greywater, solid waste and storm water, and the safe disposal or reuse of products (Katukiza et al, 2012). The above statement implies that a sustainable sanitation system should be acceptable to the community, affordable and pay attention to improvements to health and environmental protection (Katukiza et al, 2012). To improve health effects of lack or inadequate sanitation in peri-urban areas, every community needs access to acceptable sanitation that disposes of the waste, avoids defecation in the open and provision of on-site sanitation that is sufficiently protected from seasonal floods, which tend to spread toilet waste from pit latrines into a wider area. Sanitation does not only mean the provision of a toilet, it includes the

design and providing the appropriate toilet for the community in its context and the management of the sludge emanating from the toilets.

2.6.3. Sanitation and Health in South Africa

The current Covid-19 pandemic has pointed the deficiencies in the access to WASH services for many communities in South Africa. Effective WASH is vital to control and prevent spread of the coronavirus disease, as of April 2021, over 4.5 million cases and 120,000 deaths from Covid-19 in Sub-Saharan Africa, (WHO, 2021). The compound concept of WASH is comprised the three spheres, each represents a separate field of work, each is dependent on the presence of the other. For example, without toilets, water sources become contaminated and, without clean water, basic hygiene practices are not possible (UNICEF, 2016).

Association between different forms of malnutrition and environmental conditions, including water, sanitation and hygiene (WASH), contribute to poor child health, nutritional status and physical growth. Momberg, et al, 2020:830: states that "exposure to poor WASH during early childhood has been associated with higher risk of infections and poor nutritional status, including stunting". Wash interventions are implemented to prevent and control cholera by blocking exposure assumed to be risk factors for a disease transmission. A systematic review of efficacy and effectiveness of WASH interventions was completed by Yates et al, 2017, and it indicated that WASH interventions reduce disease transmission, (Wolfe, et al, 2018).

WASH related diseases have a huge impact on human health world-wide, as 1.7 billion children suffer from diarrhoeal disease annually, while in South Africa diarrhoeal infection is the third leading cause of death among children under five years of age (Kapwata et al, 2018). Better sanitation can decrease diarrhoeal disease by 28%, and that also there are notable differences in illness reduction according to the type of improved water and sanitation implemented, sewer connections were associated with greater reduction in diarrhoea compared to other on-site or non-reticulated sanitation intervention, (UNICEF, 2016).

Illnesses like diarrhoea, respiratory infections, Schistosomiasis, malnutrition, malaria, trachoma, soil transmitted helminth infections are mainly a result of poor WASH services, (Pruss-Ustiin et al, 2019). Risk factors such as access to safe water and sanitary related practices in the household and children have been reported to be associated with Soil Transmitted Helminths infections, (Sacolo-Gwebu, et al, 2019:3). The burden of disease

such as schistosomiasis and soil transmitted helminths exhibits notable commonalities; both infections thrive in poverty stricken areas with limited or no access to safe water supply and basic sanitation. Schistosomiasis and soil-transmitted helminthiases control measures include the provision of water and sanitation, health and hygiene education, snail control and treatment, (Saculo- Gwebu, 2019). Many studies on sanitation mainly focus on the health impact of lack of sanitation and avoid the household challenges faced by communities such as, access for differently abled persons, the elderly and children, and women during their menstrual cycle to use the toilet that is not connected to the house. The provision of basic services cannot keep up with the huge number of people who move to urban areas, especially in developing countries (Lagardien and Cousins, 2004).

EThekwini municipality was the first to introduce Free Basic Water in 1998, thereby influencing national policy to follow suit in 2001 by promulgating the Free Basic Sanitation Policy (DWAF, 2003). The principal responsibility for the provision of water and sanitation, as a basic service and human right, lies with the State. (Momberg et al, 2020:829). Characteristics of water include focus on the quantity and quality, as well as type and distance to, infrastructure, while the sanitation component includes focus on the access to, type of, and distance to, infrastructure; finally, the hygiene component emphasizes access to handwashing facilities with soap and nurturing good hygiene practices (UNICEF**,** 2016).

2.6.4. Sanitation and Hygiene in South Africa

According to the World Health Organization (WHO, 2019), "frequent and proper hand hygiene is one of the most important measures that can be used to control spread of Covid-19", (Blake et al, **2020).** Many studies have confirmed that a proportion of water-borne diseases arise due to poor hand hygiene. Sanitation-related diseases can be prevented if adequate hygiene facilities are accessible to all. The South African government provides free- basic sanitation services to communities and free supply of clean water to guarantee that all citizens have access to proper hygiene facilities. Safe and accessible water services for hand hygiene are critical to human health and well-being. However, access to handwashing facilities is limited in cities in the Global South, where rapid urbanisation, service backlogs, lack of infrastructure and capacity, and water scarcity impact on the ability of local governments to provide those services, (Sutherland et al, 2021). Hand-washing with soap (HWWS) is one of the most cost-effective interventions to prevent top causes of under-5 mortalities in developing countries, (Water Aid, 2018). In South Africa many Black Africans live in townships and informal settlements, this situation exacerbates the lack of hygiene within these communities. According to Amisi and Nojiyeza, 2008, "in Durban, the provision

of clean water to black households and settlements were relatively expensive”, for instance in Inanda a 25 litre bucket was sold for 25 cents”.

In addition to these challenges, townships and informal settlements suffered from a lack of sewage infrastructure and sewer-treatment facilities. In Inanda residents make use of pit latrines, while in townships they utilize portable toilets. Access to water for poor settlements was made available in the form of a spigot (standpipe), servicing approximately fifteen thousand to twenty thousand people (Amisi & Nojiyeza, 2008). Lack of good hygiene practices, such as toilet use, handwashing with soap, water treatment, food hygiene, and menstrual hygiene, the benefits of other poverty reduction strategies will be undermined, and human dignity will be compromised (Taylor et al,2015).

There is evidence supporting promotion of hand washing to reduce diarrhoeal disease, (Taylor et al, 2015). Handwashing with soap and water is widely recognized as being essential in reducing disease transmission, (Sutherland et al, 2021**).** Easily accessible, safe and user-friendly handwashing systems have become crucial as the main strategy to curb Covid-19 transmission through washing of hands with water and soap. Staddon et al, 2020 remarks that “the epidemic has highlighted the lack of availability of water for basic handwashing practices in informal settlements, schools, and rural areas in the Global South”.

National Sanitation Policy (1997) mentions that “while municipalities provide hygiene awareness programs as a once off intervention during implementation of basic sanitation infrastructure, they do not include ongoing hygiene education as a component of Free Basic Sanitation”. Research has shown that once-off events or visits to an individual in the household are not an effective means of achieving the end- goals of behavioral change of poor sanitation practices”, (National Sanitation Policy, 1997). According to the Water Service Act, no. of 1997, “the minimum standards for basic sanitation service include “the provision of appropriate education”. The proper disposal of household waste and refuse is important to maintain environmental hygiene of community.

2.6.5. Sanitation and Solid Waste

The opus of solid wastes varies with income; low-to-middle-income population produces mainly organic wastes, while high-income population produce more waste paper, metals and glasses. The management of municipal solid waste includes: recycling, incineration, waste-to-energy conversion, composting or landfilling; landfilling for solid waste disposal is favoured in many municipalities globally.

Landfill sites act as environmental reactors where wastes undergo physical, chemical and biological changes, (Nanda and Berruti, 2021:1433). The challenge confronted by many municipalities in South Africa and the developing world is urbanization and dense concentration of population in one area, thus putting pressure on the municipal infrastructure needed for effective waste management, (Ndebele and Du Plessis, 2015). According to Ndebele and Du Plessis, 2015:1 “ineffective waste management services has been a persistent problem in eThekwini municipality townships which has led to many illegal dumping and informal dump sites being generated by the community, costing the municipality over R180 000 000 annually in removal and rehabilitation”. Proper solid waste is a major environmental problem in growing cities and townships of South Africa, (Rasmeni and Madyira, 2019). Rasmeni et al, (2019:1026), argues that “less than half of the solid waste generated is collected in urban centers throughout the continent of which 95% of it is neither contained nor recycled, but thrown away at dumping sites polluting the air and also nearby water sources”. There is evidence of a link between poor solid waste management and adverse health outcomes, (Ziraba et al, 2016).

Provision of hygienic, dignified, accessible and environmentally-sustainable sanitation is essential to human health and well-being. However, universal provision of sanitation remains a challenge, particularly in countries in the Global South. Here, rapid urbanisation, with its resultant informality and sanitation backlogs; poverty and inequality; water security challenges; failing infrastructure; and lack of institutional capacity undermine efforts to ensure safe sanitation for all. As a result, achieving Sustainable Development Goal 6 on clean water and sanitation remains a challenge, with 2.3 billion people still lacking basic sanitation services in 2018 (United Nations, 2018). Solid waste management plays a vital role in the drive towards achieving sustainable development, (Ikhlayel, 2018). Waste, according to The National Environmental Management: Waste Act, no 59 of 2008; defines waste as “any substance that can be reduced, reused, recycled, recovered and considered surplus, rejected, discarded, and abandoned or disposed of in which the generator has no further use for it for production” (Integrated Waste Management Plan, 2016). In South Africa

waste is generated in a wide range of activities such as mining, manufacturing, commercial, and construction by individuals, businesses, institutions, and industries daily. In South Africa, waste is placed in plastic bags and bins and collection is done on a weekly basis by private contractors, and sent to communal dumpsites or central collection points. According to South Africa's Constitution Act 108 of 1996, schedule 5, part B, local municipalities are responsible for the provision of waste collection services, (Department of Environmental Affairs, 2018).

2.7 CONCLUSION

This chapter clearly outlines current literature with reference to the study.

CHAPTER THREE

METHODOLOGY

3.1. INTRODUCTION

This chapter outlines the methodology used in assessing poor sanitation and hygiene practices in Ezimangweni in Inanda, KwaZulu-Natal. The chapter focuses on the study design, study population, selection of sample size, inclusion and exclusion criterion, data collection methods, validity and reliability of the data, data analysis and ethical considerations. O'Leary, 2004:.85, "describes methodology as the framework which is associated with a particular set of paradigmatic assumptions that we will use to conduct our research". The objectives of this study were to (1) to assess the knowledge of the community regarding health and hygiene practices, (2) to identify the root causes of poor sanitation in Ezimangweni, and (3) to assess challenges faced by the community regarding sanitation services. The study adopted a cross-sectional descriptive design, which supported the researcher in assessing and describing the performance of the participants at a specific point in time.

A cross-sectional study was conducted from February to April, 2021 among 163 systematically selected households and three clinicians (0ne doctor and two nurses, all from Paediatrics department) from Inanda Community Health Centre and two officials from EThekwini municipality (a Water and Sanitation Senior Technologist and a local Councillor from Ward 107). Data were collected by researcher using a pre-tested, structured questionnaire via face-to-face interviews and on-the-spot observations of the latrines. A systematic random sampling method was used to select respondent's households. Data were entered using EpiData version 3.1 and exported to Statistical Package for the Social Sciences (SPSS) version 27.0. Univariate and multivariate analysis were carried to determine the relationships between the potential associated factors and the sanitation as well as hygiene status. To address the key research objectives of the study, the research used quantitative and observation. In a cross-sectional study, the investigator measures the outcome and the exposures in the study respondents at the same time. The respondents in a cross-sectional study are selected based on the inclusion and exclusion criteria set for the study. Once the respondents have been selected for the study, the investigator follows the study to assess the exposure and the outcomes.

3.2. STUDY DESIGN

This research study was a descriptive study of cross-sectional design, using a questionnaire as a data collection tool. The questionnaire (Appendix b) contained the following sections; demographics, general, health and lifestyle. Cross-sectional studies are carried out at one time in point or over a short period. They are usually conducted to estimate the prevalence of the outcome of interest for a given population, commonly for the purposes of public health planning. Cross-sectional studies provide a 'snapshot' of the outcome and the characteristics associated with it, at a specific point in time (Levin, 2006:24). The researcher used quantitative study designs.

While quantitative research is essentially a deductive research method that encompasses the conducting of measurements, application of analysis and drawing up of conclusions (Watson, 2015: 44). Quantitative research emphasizes objective measurements and statistical, mathematical analysis of data collected through questionnaires, surveys or using computational techniques. Therefore, in this study data will be collected using closed-ended data.

3.3. STUDY POPULATION

According to Frankel and Warren, 2002, "study population refers to the complete set of individuals (subjects or events) having common characteristics in which the researcher is interested". The study was conducted in Ezimangweni in Inanda, under Ward 107. The units of analysis in the study were head of households, local Councillor and eThekwini Water and Sanitation (EWS) official and healthcare professionals (Doctor and two nurses) from Inanda C Community Health Centre Paediatric department. The study population was determined based on a systematic random sample. The study population was 168 including, 163 households, two nurses and one doctor from the Paediatric department and the local Councillor and an official from EThekwini Water and Sanitation Unit.

3.4. SAMPLING SIZE

3.4.1. Sampling Strategy

The purpose of the sampling technique is to provide a representative sample of the population of interest (Bujang et al, 2012). Probability sampling techniques was used in the study; probability sampling is the one in which each person in the population has a known probability of being selected. The selection of participants from the population was based on the same form of random procedure. A target population of 170 participants was estimated by the Raosoft® software package as a minimum response rate (70%) to provide generalizability (Singh, 2016). A 95% confidence level and a 5% margin of error. The sample size included participants above 18 years of age in each household.

3.5. SELECTION OF RESPONDENTS

Probability random sampling approach was used in the selection of participants, as it was fair and provides equal opportunity for study participants. The maximum sample size was 170 head of each household. If the head of the household or his/her proxy of the unit was unwilling to participate in the research, the researcher moved to the next unit until the required sample size was reached.

3.6. INCLUSION CRITERIA

The participants were:

Community members residing in Ezimangweni,

Nurses/Doctor working at Inanda Community Health Centre

Participants 18 years and older

EThekwini Municipality Water Services Officials

3.7. EXCLUSION CRITERIA

Below 18 years

Not permanent residence of Ezimangweni

Not employees of Inanda C Community Health Centre or senior official in EThekwini Municipality.

3.8. DATA COLLECTION

3.8.1. Questionnaire

Quantitative data will be collected using questionnaires (Appendix B). Questionnaires will be administered and collected by the researcher. The main tool for collecting information in practical research is questionnaire, due to the fact that the researcher can decide on the types of questions to be asked, (Saunders and Thornhill, 2009). Since the study was carried over during the Covid-19 pandemic, verbal consent was undertaken. The researcher read the Consent form and Letter of Information (Appendix C 1 and C2 and Appendix D 1 and D 2) respectively, to minimize contact with the participants and in observation of Covid-19 regulations of Social Distancing. During administering of the questionnaire, the researcher explained the main purpose of the questionnaire to the participants and what is expected of them. The questionnaires were administered by the researcher by reading out the questions and response options available, and then tick the questionnaire as per respondent's response. The questionnaire comprised of 62 questions, categorised into sections (section A – F) as briefly described in table below. The questions were designed to assess sanitation and hygiene practices in Ezimangweni.

Table 3.1: Sections of the questionnaire survey.

Section	Description
A: Demographics	Acquire demographic information about as age, gender, level of education, number of individuals living in the household, occupation household income and type of dwelling.
B: Describe sanitation services	Looking at the type of sanitation facility, location of sanitation facility in the in the yard, disposal of waste, frequency of emptying, water availability and service satisfaction.
C: Payment of Services	Assessing whether municipal services are paid by the user.
D: Community participation on sanitation service delivery	Assessing the involvement of community in decision making and project monitoring and evaluation
E: Waste Management	Assessing role of all stakeholders in sanitation provision.
F: Sanitation, hygiene education and practices	Assessing knowledge of sanitation and hygiene practices in the area, hygiene status, illnesses prevalent in the area and overall health status.

According to Neuman (2011), “a semi-structured interview is a type of interview technique that uses mostly open-ended questions so as to obtain rich and descriptive information from participants”. Semi-structured questionnaire is a type of interview in which the interviewer asks only a few predefined questions while the rest of the questions are not planned in advance. The study used a semi-structured interview questionnaire (Appendix A1 and A2) were used for the local Councillor, EThekwini municipality official and the Doctor and nurses. The guide contains questions that will let the researcher explore the knowledge, attitudes, and challenges confronted by eThekwini Water Services when providing sanitation and hygiene services to the area. All interviews were conducted at convenient times and a

suitable venue for the participants. Interviews were conducted following all Covid-19 protocols, physical contact was non-existent, the researcher worn a mask and carried a sanitiser at all times and were carried outside during the day (week-days and weekends).

3.9. PILOTING OF THE STUDY

Bless and Higson-Smith, (2000:155), defines "pilot study" as a small study conducted before a larger piece of research to determine whether the methodology, sampling, instruments, and analysis are adequate and appropriate”. The questionnaire was piloted at Nhlungwane, to check the reliability and validity of the measuring tool. Nhlungwane is a peri-urban settlement with quite similar characteristic with Ezimangweni. Five households were randomly selected to pilot the tool and these households will not form part of the 170 participants for the main study population. The head of each household or his/her proxy in the household were invited to participate in the pilot study. After receipt of a signed informed consent form, piloting of the study instruments were undertaken. Any suggested changes implemented to ensure that study tools are meaningful, user friendly and suitable to the participants in the actual study.

3.10. VALIDITY AND RELIABILITY

The pre-test for questionnaire, interview guides was conducted to validate that the tool content was valid or not understandable by the respondents. Thus, content validity (in which questions are answered to the respondent without excluding important points), internal validity (in which the question raised answer the outcomes of the researcher target), and external validity (in which the result can generalize to all the population from the survey sample population) were reflected. The pilot test made for the questionnaire test was five households selected randomly from a peri-urban settlement with similar characteristics and not forming part of the actual study population. The study instruments were piloted prior to study commencement. All changes that resulted from the pilot study were implemented for use in the actual study. The researcher administered the questionnaire. Face validity, and Content validity and criterion validity was maintained in data collection tools as follows:

3.10.1. Face validity

Face validity is defined by Babbie, 2010**,** as **“**an indicator that makes it seem reasonable measure of some variable, and it is the subjective judgement that the measures what it

intends to measure in terms of relevance". The researcher ensured, in the study, when developing the instrument that uncertainties were eliminated by using appropriate words and concepts in order to enrich clarity and general suitability. The questionnaire was meant to measure poor sanitation and hygiene practices of residents living in Ezimangweni. For the piloting stage, respondents were selected from a peri-urban settlement with similar characteristics as those of the actual study area, to respond to a questionnaire. After the participants completed the questionnaire, they were asked the following questions: (1) what do they think was the purpose of the questionnaire: (2), what do they believe was being measured and (3) whether or not they feel the questionnaire was an adequate measure of their sanitation and hygiene status. The information gained from the piloting stage was then used to re-assess and correct the questionnaire used in the actual study.

3.10.2. Content validity and Criterion validity

Content validity of the measuring instrument was strengthened, as the tool was piloted in the Nhlungwane area, a peri-urban area adjacent to the study area with almost similar characteristics to the study area. The investigator also presented the questionnaire to the research supervisor and Ethics Committee to ensure validity of the measuring instrument whether the instrument can be considered valid on face value. Delport and Roesternburg, 2011:172, also contends that "the validity of a measurement instrument refers to the degree to which the instrument measures what it is required to measure".

3.10.3. Reliability

Reliability can be defined as the measuring instrument's ability to obtain consistent numerical results each time it is applied (Delport and Roesternburg, 2011:177). Reliability of a measurements specifies the amount to which it is without bias (error free) and ensures consistent measurement across time and across the various items in the instrument. Therefore, the reliability of the measuring instrument was ensured by:

- Removing unclear and ambiguous questions on the measuring tool.
- By ensuring that the measuring tool was first piloted before being used in the study area to ensure that it was user-friendly and reliable.

3.11. THE SCOPE AND DELIMITATIONS OF THE STUDY

The scope of the research on poor sanitation and hygiene practices was not limited to sanitation and hygiene practices in the community of Ezimangweni, but also looks at waste disposal, as well as the health impact of poor sanitation and hygiene practices. However, the research was limited to the research problems related to poor sanitation and hygiene practices at the household level and was based on data collected from sampled households, EThekwini Municipality Water and sanitation official, doctor and nurses from nearby Inanda Community Health Centre and the Councillor for the area. The research exclude an assessment based on data gathered from institutions. The results from the study may not be generalized in the province or the entire country, since it was conducted in one sub-urban setting in Inanda EThekwini Municipality, KwaZulu-Natal.

3.12. DATA ANALYSIS

All data collected through the questionnaire process was categorized, coded and entered into a computer on a Microsoft Excel document and transferred onto (SPSS Statistics Version 27.0) software statistical package in which analysis will be conducted. The statistics were summarised using standard deviation, mean and range for quantitative normally distributed variables. Results were then presented in the form of graphs, tables, and histograms. Bar charts. Frequency tables were used to represent the descriptive data. A p-value of <0.05 was considered as statistically significant.

3.13. ETHICAL CONSIDERATIONS

Full ethical approval was granted from the Institutional Research and Ethics Committee (IREC) at the Durban University of Technology.

Permission was sought from Inanda Community Health Centre to interview a Doctor and two nurses.

The EThekwini Municipality granted written permission to conduct the study in Ezimangweni.

Permission to conduct the study in the study area sought from the Ward Councillor (Appendix B).

The investigator read the Letter of Information and Informed Consent, respectively to all respondents before the investigation.

Non maleficence was ensured as participants did not suffer any harm from the research.

Justice was ensured throughout as the study was fair and impartial.

There was no direct benefit for participation and each participant was treated the same.

Respondents were able to withdraw from the study at any time as the process was voluntary.

The research data would be utilised by the researcher, the research supervisor and the statistician only, and confidentiality was maintained at all times.

Data collected would be safely stored and should be kept for 5 years in the DUT Faculty of Health Sciences department, thereafter will be destroyed by shredding.

3.14 CONCLUSION

This Chapter presented the research approach and defined the research design, population, sample size, data analysis, data collection instrument, and ethical considerations. The following chapter (Chapter 4) will present the findings of the research and analyses of the results.

CHAPTER FOUR

RESULTS

4.1. INTRODUCTION

This chapter presents the results and discusses the findings obtained from the questionnaires used in to collect data for the study. The questionnaire was the main tools that was used to collect data from 170 participants. The information collected from the responses was analysed with SPSS version 27.0. The results were then presented as descriptive statistics in the form of graphs, cross tabulations for the quantitative data that was collected. Inferential techniques include the use of correlation and Chi square test values, which were interpreted using the p-values. The traditional approach to reporting a result requires a statement of statistical significance. A p-value is generated from a test static. A significant result is indicated with "$p < 0.05$".

4.2. THE SAMPLE

In total, 170 questionnaires were distributed and only 163 questionnaires were analysed which gave a 95% response rate.

4.3 THE RESEARCH INSTRUMENT

The questionnaire consisted of 102 items, with a level of measurement at a nominal or an ordinal level. The questionnaire was divided into 6 sections which measured various themes as illustrated below:

A Household Profile

B Sanitation Disposal

C Payment of Services

D Community Participation

E Governance and Context

F Sanitation Hygiene Education & Practices

4.4. SOCIO-DEMOGRAPHIC CHARACTERISTICS

Table 2 shows results from the univariate analysis of the respondent's demographic characteristics. This section summarises the biographical characteristics of the respondents.

Generally, the ratio of males to females was approximately 1:3 (23.9%: 76.1%) ($p < 0.001$). Within the age category of 31 to 40 years, 25.0% were male. Within the category of males (only), 28.2% were between the ages of 31 to 40 years. This category of males between the ages of 31 to 40 years formed 6.7% of the total sample. As woman are always burdened with the task of ensuring the hygiene and up-keep of the household, they made 76, 1 % of the respondents in the study. The age distribution for the study was closely distributed ($p< 0.073$).

In Moser's, (1993) framework, women play a number of roles, for instance; females are often at the forefront of inequalities tied to WASH infrastructure (Georgi, et al, 2021).

Table 4.1: Socio-demographic data of the respondents

		Gender		Total
Age (in years)		Male	Female	
18 – 30	Count	6	32	38
	% within Age (in years)	15.8%	84.2%	100.0%
	% within Gender	15.4%	25.8%	23.3%
	% of Total	3.7%	19.6%	23.3%
31 – 40	Count	11	33	44
	% within Age (in years)	25.0%	75.0%	100.0%
	% within Gender	28.2%	26.6%	27.0%
	% of Total	6.7%	20.2%	27.0%
41 – 50	Count	8	18	26
	% within Age (in years)	30.8%	69.2%	100.0%
	% within Gender	20.5%	14.5%	16.0%
	% of Total	4.9%	11.0%	16.0%
51 – 60	Count	8	23	31
	% within Age (in years)	25.8%	74.2%	100.0%
	% within Gender	20.5%	18.5%	19.0%
	% of Total	4.9%	14.1%	19.0%
> 60	Count	6	18	24
	% within Age (in years)	25.0%	75.0%	100.0%
	% within Gender	15.4%	14.5%	14.7%
	% of Total	3.7%	11.0%	14.7%
Total	Count	39	124	163
	% within Age (in years)	23.9%	76.1%	100.0%
	% within Gender	100.0%	100.0%	100.0%
	% of Total	23.9%	76.1%	100.0%

4.5. EMPLOYMENT STATUS OF RESPONDENTS

There were 117 respondents who were unemployed (71.8%). There were similar numbers of labourers and pensioners (7.4%), with smaller numbers of remaining categories ($p < 0.001$). The results revealed that a little less than three thirds of the population had no job and any prospects of a decent living due to high crime in the area of Inanda.

Table 4.2: The occupation of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unemployed	117	71.8	71.8	71.8
	Domestic worker	7	4.3	4.3	76.1
	Labourer	12	7.4	7.4	83.4
	Business owner	1	0.6	0.6	84.0
	Manager	1	0.6	0.6	84.7
	Professional	6	3.7	3.7	88.3
	Pensioner	12	7.4	7.4	95.7
	Other	7	4.3	4.3	100.0
	Total	163	100.0	100.0	

Table 4.3: Respondents' employment status

	Frequency	Percent
Unemployed	117	71.8
Labourer	12	7.4
Pensioner	12	7.4
Domestic worker	7	4.3
Professional	6	3.7
Business owner	1	0.6
Manager	1	0.6
Other	7	4.3
Total	163	100.0

4.6. EDUCATION LEVEL OF RESPONDENTS

Table 6, show education level of the respondents. Education level of the respondents were, 4 respondents with degrees, 10 respondents had diplomas, 63 had matric, 61 respondents had reached secondary school, 11 with primary schooling and 14 had not attended school. There were 38.7% of the respondents with matric certificates. A little more than three-quarters of the respondents (76.1%) had at most a school qualification. Less than 9% of the respondents had a post school qualification ($p < 0.001$). The findings showed that 38.7% of the respondents had matric and 37.4% had reached secondary school level. This finding is significant as it showed that the majority of the respondents can be able to comprehend hygiene education material. A reasonable percentage of the respondents did not have higher qualification. In a study conducted by Abanyie, et al, 2022:7," showed a strong relationship between the importance of sanitation and the respondent's level of education, further suggesting that people's level of education significantly influences their awareness and the need for proper sanitation".

Table 4.4: Education levels of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	14	8.6	8.6	8.6
	Primary school	11	6.7	6.7	15.3
	Secondary school	61	37.4	37.4	52.8
	Matric	63	38.7	38.7	91.4
	Diploma	10	6.1	6.1	97.5
	Degree	4	2.5	2.5	100.0
	Total	163	100.0	100.0	

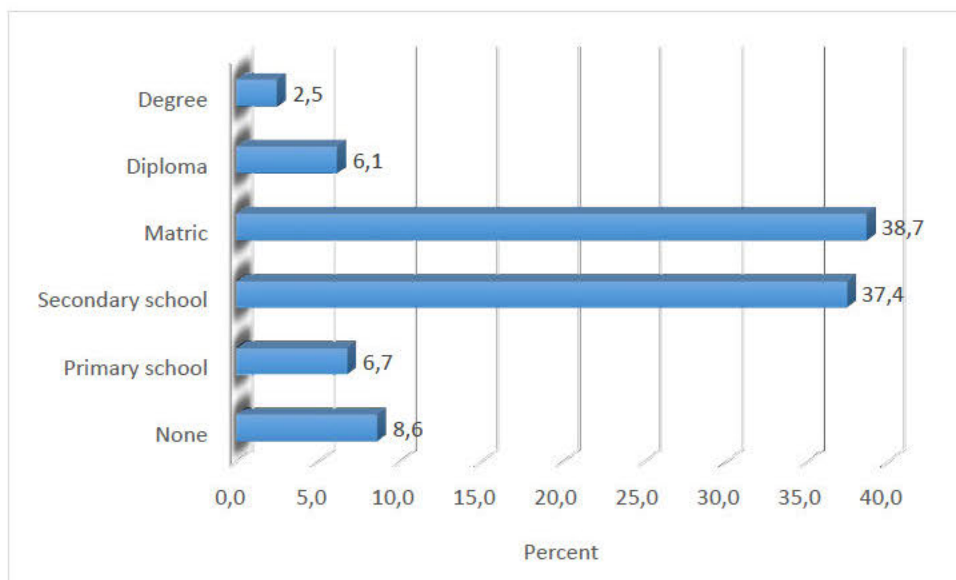

Figure 4.1: Education level of respondents

4.7. HOUSEHOLD INCOME

Table 6, below indicates the household income, the majority of the respondents earned between R1050 and R2050 ($p < 0.001$). A quarter of the respondents (26.4%) earned less than R1050. The pandemic has contributed to income loss for many individuals and companies with vulnerable population, this in turn result in reduced ability to access healthcare and nutrition thus adversely affecting health, (Nwosu and Oyenubi, 2021).

Table 4.5: Total Income of household

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 500	23	14.1	14.1	14.1
	501 – 1050	20	12.3	12.3	26.4
	1051 – 2050	55	33.7	33.7	60.1
	2051 – 3050	16	9.8	9.8	69.9
	3051 – 4050	21	12.9	12.9	82.8
	> 4051	28	17.2	17.2	100.0
	Total	163	100.0	100.0	

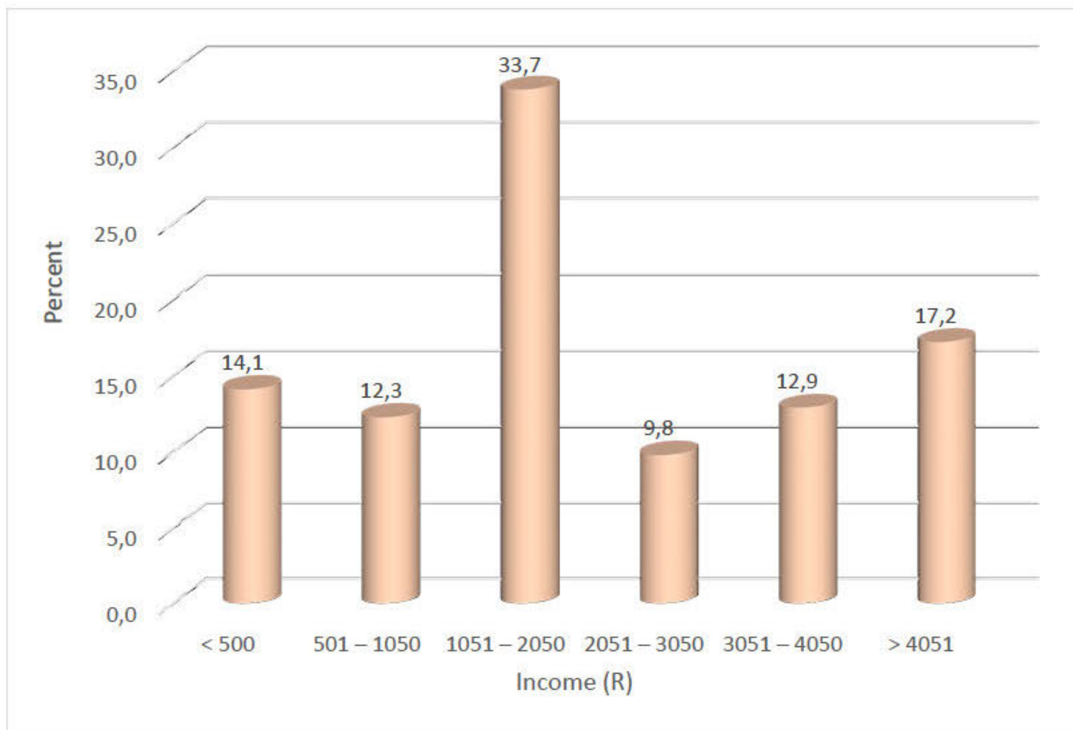

Figure 4.2. Household income

4.8. TYPE OF DWELLING

Sanitation and maintenance of a house greatly influence health and safety of the occupants living in that household. A healthful household should be of sound structure, be free of hazards, provide adequate facility for sleeping, personal hygiene and be an environment for comfort and relaxation and privacy. Inadequate sanitation systems impact on health of the community and the environment, as witnessed by the annual cases of diarrhoea amongst under five-year-old children and outbreak of water-related diseases, such as cholera. The majority of the respondents lived in formal dwellings (98.2%) ($p < 0.001$).

Table 4.6: The type of dwelling of the respondents.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Formal dwelling	160	98.2	98.2	98.2
	Shack / informal dwelling	3	1.8	1.8	100.0
	Total	163	100.0	100.0	

Many houses in Ezimangweni were built in 1995 (RDP one room houses), that is twenty-seven years and many households have increased and thus putting pressure on available resources such as toilets getting full much quicker. Many respondents reported that they have lived in Ezimangweni more than twenty years, (66.3%). Some of these RDP houses are now deteriorating and no longer serve the entire family, thus resulting in overcrowding.

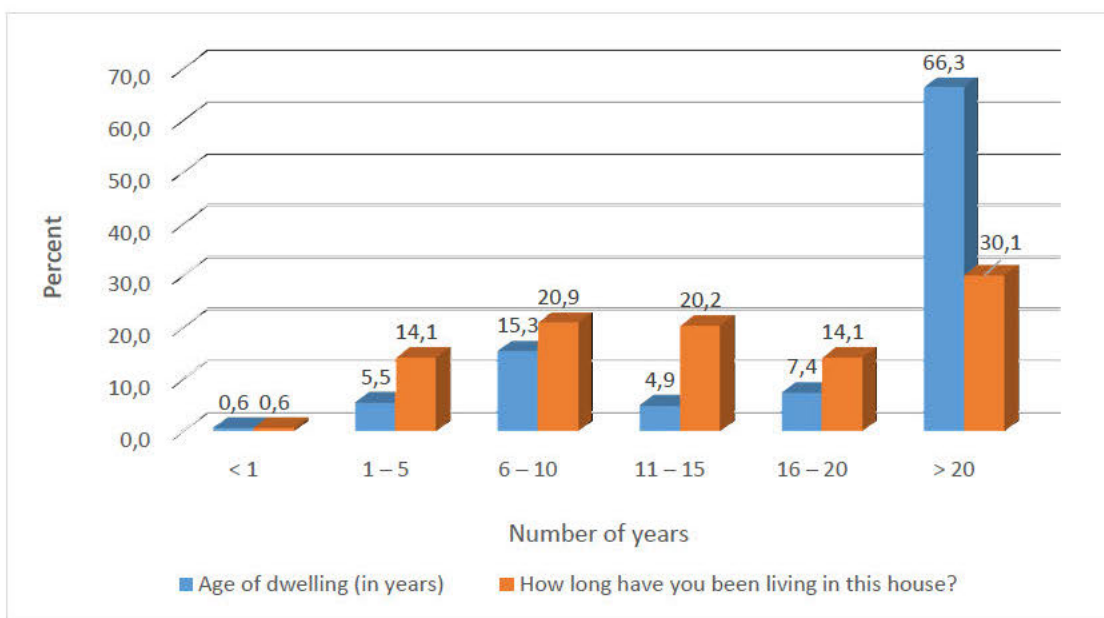

Figure 4.3. Age of dwelling and period of residence

There are similar responses to the age and length of occupation of the dwellings. However, there are significantly higher responses for the time period > 20 years ($p < 0.001$). Two-thirds of the respondents (66.3%) indicated that the age of the dwellings were older than 20 years, but a little less than a third (30.1%) had lived in the dwelling for the same period (> 20 years). These findings reveal that most of the one roomed houses are much older and this include the pit toilet structure as the housing were built in 1995. Most of the pit have been destroyed during rainy seasons and pit filled up. The majority of the respondents have lived in Ezimangweni for more than twenty years.

Table 4.7 Length of stay in area

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 1	1	0.6	0.6	0.6
	1 – 5	23	14.1	14.1	14.7
	6 – 10	34	20.9	20.9	35.6
	11 – 15	33	20.2	20.2	55.8
	16 – 20	23	14.1	14.1	69.9
	> 20	49	30.1	30.1	100.0
	Total	163	100.0	100.0	

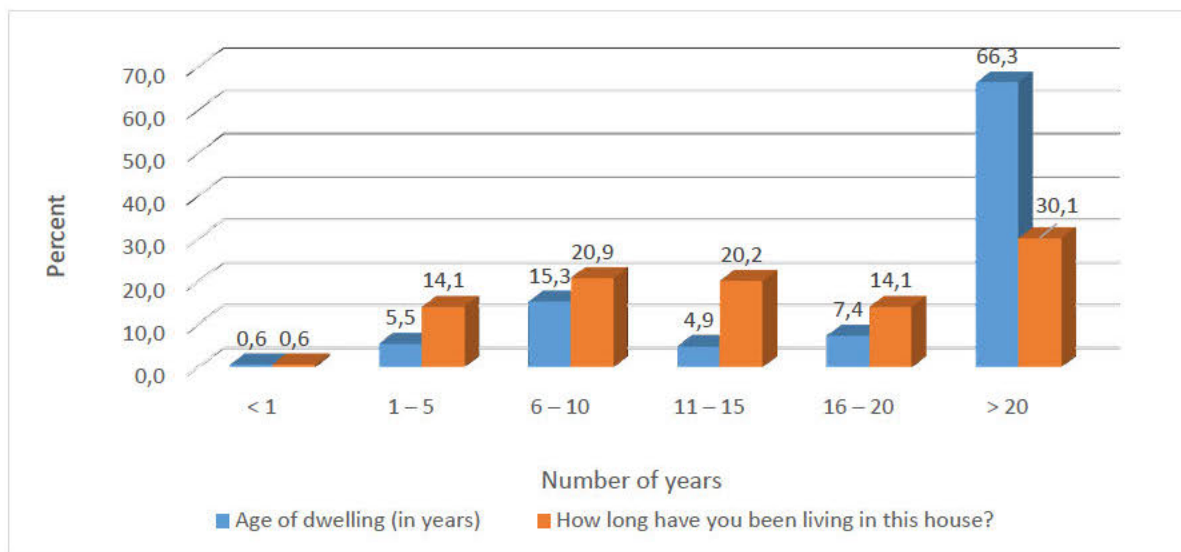

Figure 4.4. Number of years in same dwelling

4.9. SANITATION PROVIDED IN EZIMANGWENI

This section deals with scoring patterns of the respondents. As the results were presented using summarised percentages for each variable that constitute each section, the results are further analysed according to the importance of the statements.

Figure 4.8 picture of a pit latrine

4.9.1 Type of sanitation facility

Most of the respondents indicated that pit latrines were used (93.2%) ($p < 0.001$). These pit latrines are more than 20 years old (structure), some respondents (4.9%) have opted to use pour flush and septic tanks. Due to the terrain and lack of proper planning of the area, these septic tanks are not regularly emptied. The por flush toilets empties to shallow pits, thus contributing to underground water contamination and environmental contamination due to sippage. Most households had pit latrines with a slab (92%). Though these latrines are in a bad state structurally and hygienically as water was located in the yard or outside the toilet.

Table 4.8, 4.9 and 4.10 below summarises the scoring patterns for the type of toilet facility the respondent and entire household use.

Flush/pour flush

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Flush to septic tank	8	4.9	100.0	100.0
Missing	System	155	95.1		
Total		163	100.0		

Dry pit latrines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pit latrine with slab	150	92.0	98.7	98.7
	Pit latrine without slab / Open pit	2	1.2	1.3	100.0
	Total	152	93.3	100.0	
Missing	System	11	6.7		
Total		163	100.0		

Bucket

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hanging toilet / hanging latrine	1	0.6	100.0	100.0
Missing	System	162	99.4		
Total		163	100.0		

4.9.2. Location of Pit Latrine

The majority of the respondents indicated that the toilet was located in the own yard ($p < 0.001$). There were eleven (6.7 %) respondents who indicated that their toilet was located in the dwelling, cmpared to 90.5% of the respondents who have their toilet in the yard. The major problem observed in Ezimangweni as far as latrines was that space to dig another pit when the was full were limited due to congestion of houses. The endervours by the Ethekwini municipality to contract privite companies to do the emptying has not alleviated the problem of contaminated stagnant water next to dwellings. It was also concerning to found out that there were households wothout any means of disposing their excreta (3.1%). Goal 6, Target 6.2 which stipulates, "to ensure the accessibility and sustainable management of water and sanitation for all". By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

Table 4.11 Location of the pit latrine in the household

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	In own dwelling	11	6.7	6.7	6.7
	In own yard/plot	147	90.2	90.2	96.9
	Elsewhere	5	3.1	3.1	100.0
	Total	163	100.0	100.0	

4.9.3 Emptying of Pit Latrines

The safe management of faecal sludge, hygienic emptying, transport and treatment or disposal of faecal sludge is a crucial part of safely managed sanitation, more than anywhere than in small towns and cities with limited sewer coverage, (Capone, et al,2017). The study has showed that many pit latrines emptying in Ezimangweni are full and pit latrine emptying was seen not to be dependable. However, lack of available space and construction cost of new latrine means that emptying was the only alternative for the community of Ezimangweni. But pit emptying has been neglected and this have serious health and environmental consequences, such as spread

of diseases like diarrhoea, outbreak of cholera, and high infant mortality, (Thye, et al, 2009). The study revealed that 39.9% of the household's pit latrines were emptied more than a year ago before the study was conducted.

FIgure 4.8 Pit emptying

4.10. Quality of service

Many respondents indicated that they were receiving a poor service from the Municipality, while only 6.7% indicated that the service was satisfactory and 3.1% saying the service was good.

Table 4.12 Respondent's perception on quality of service they are getting.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor quality	138	84.7	85.2	85.2
	Satisfactory quality	11	6.7	6.8	92.0
	Good	5	3.1	3.1	95.1
	Don't' know	8	4.9	4.9	100.0
	Total	162	99.4	100.0	
Missing	System	1	0.6		
Total		163	100.0		

< 0.001

4.10.1. Water supply in Ezimangweni

The study showed that 90.2% of the respondents received their drinking water from a standpipe in the yard while only 7.4% had water inside their houses. While 1.8% of the respondents were getting water from elsewhere.

Table 4.13 Where water is collected

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	In own dwelling	12	7.4	7.4	7.4	
	In own yard/plot	147	90.2	90.7	98.1	
	Elsewhere	3	1.8	1.9	100.0	
	Total	162	99.4	100.0		< 0.001
Missing	System	1	0.6			
Total		163	100.0			

More than a quarter of the respondents (77.3%), complained that water is not always sufficient, and this was more evident at night. Water availability was very crucial in the fight for improved WASH program.

Table 4.14 Frequency of water interruptions in Ezimangweni

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Yes, at least once	32	19.6	19.6	19.6	
	No, always sufficient	126	77.3	77.3	96.9	
	Don't know	5	3.1	3.1	100.0	
	Total	163	100.0	100.0		<0.001

Only 0.6% of the respondents were very satisfiedand 27% were satisfied with the water supply and 32.1% were neutral while 33.3% were dissatisfied and 6.75 were very dissatisfied.

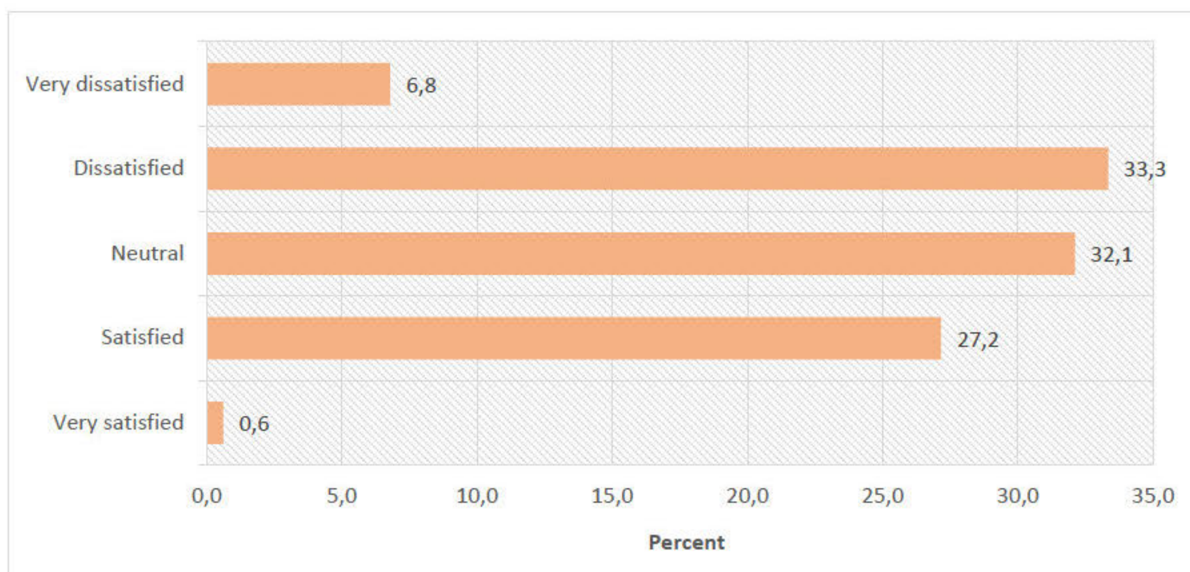

Figure 4.9 Respondents satisfaction with water supply.

4.11. PAYMENT FOR MUNICIPAL SERVICES

Only 24.5% of the respondents indicated that they were able to afford paying for water, and 75.5% indicated that they were not able to pay for water for their households.

Table 4.15 Payment of services

	Frequency	Percent
Yes	40	24.5
No	123	75.5
Total	163	100.0

Many respondents (92.6%) revealed that water leaks were very common in the area while 6.1% indicated that leakages were not common. This was very significant as EThekwini is continuasly facing water shortages and unrepaired leaks leads to infestation of flies and spread of water-related diseases such as diarrhea due to ingestion of water contaminated with sewage due to shallow or overflowing pit latrines.

Table 4.16 Frequency of leakages in the area

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Yes	151	92.6	92.6	92.6	
	No	10	6.1	6.1	98.8	
	Don't know	2	1.2	1.2	100.0	
	Total	163	100.0	100.0		< 0.001

More than half (54.6%) of the respondents mentioned that it took more than three days for the municipality to repair reported water leaks in the area.

Table 4.17 Time taken to repair water leaks.

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Within one day	4	2.5	2.5	2.5	
	1 – 2 days	16	9.8	10.1	12.7	
	2- 3 days	49	30.1	31.0	43.7	
	> 3 days	89	54.6	56.3	100.0	
	Total	158	96.9	100.0		< 0.001
Missing	System	5	3.1			
Total		163	100.0			

4.12. HYGIENE

The study showed that 96.9% of the respondents wash hands after using the toilet. While 2.5% of the respondents reported that they either forget or do not frequently wash hands after using the toilet.

Table 4.16 Frequency of hand washing

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Yes	158	96.9	97.5	97.5	
	No	4	2.5	2.5	100.0	
	Total	162	99.4	100.0		< 0.001
Missing	System	1	0.6			
Total		163	100.0			

4.12.1. Hand washing behaviour

The study revealed that 21.8% wash hands before eating, 71.8% wash their hands after eating while 98.2% only wash their hands after using the toilet.

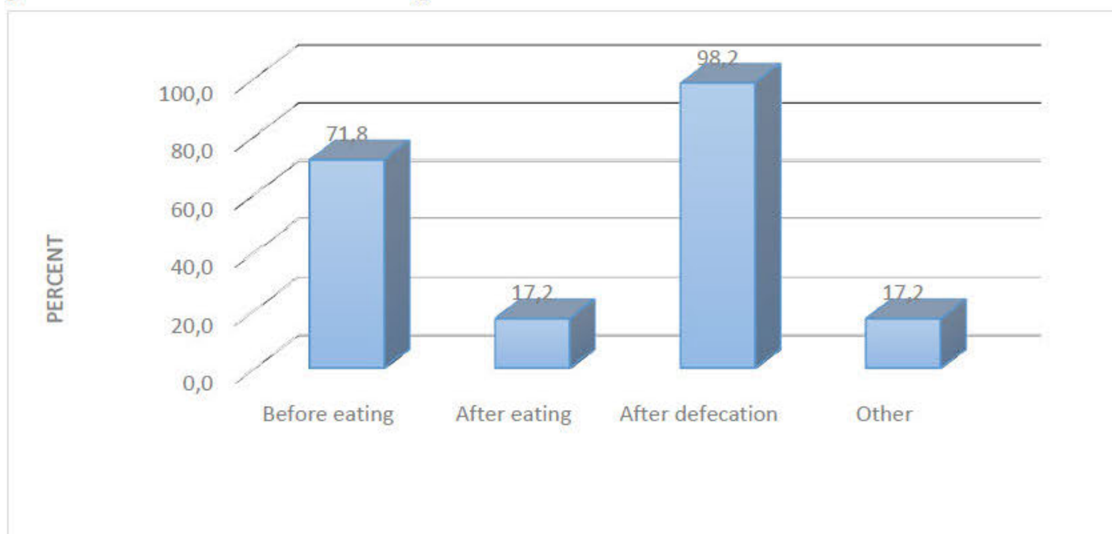

Figure 4.10 Frequency of hand washing

4.12.2. Frequency of toilet cleaning

The study showed that 71.2% of the respondents wash their toilets on a weekly basis, 12.9% clean theirs fortnightly while 7.45 clean their toilets on a monthly basis and 1.2% only clean their toilets every three months. There were respondents, 6.75 who do not often clean their toilets and a 0.6% who do not clean their toilets.

Table 4.18 Frequency of toilet cleaning

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Weekly	116	71.2	71.2	71.2	
	Fortnightly	21	12.9	12.9	84.0	
	Monthly	12	7.4	7.4	91.4	
	Every 3 months	2	1.2	1.2	92.6	
	Not often	11	6.7	6.7	99.4	
	Don't clean	1	0.6	0.6	100.0	
	Total	163	100.0	100.0		< 0.001

4.12.3. Cleaning material use to clean toilets

Jays fluid was reported as the main cleaning material used by many households visited to clean and disinfect their pit latrines.

4.12.4. Toilet sharing in the area

There were respondents who reported that their neigbours do not have a toilet or their toilets are full and unusable so they share their toilet with them. There were 17.2% households under study who reported that they share their toilets with neigbours. The results also revealed that the local Councilor said there were 3202 households without a pit latrine while information from the Ethekwini municipality official revealed that there were 150 households without a toilet facility in their household. Whether the information from these two municipal officials differs greatly or not, the obvious fact is that nobody knows how bad the situation is at Ezimangweni insofar as provision of safe, and sustainable hygiene is in the area.

Table 4.19 Number of households sharing toilets

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Yes	28	17.2	17.2	17.2	
	No	135	82.8	82.8	100.0	
	Total	163	100.0	100.0		<0.001

The above was supported by the number of respondents who revealed that they were dissatisfied with their toilets and complained that they fill-up quickly as 28 households out of 135 households visited were sharing.

4.12.5. Other people sharing the toilet

The results showed that other households share their toilet with one to five people (4.5%) while other households share with six or more people (14.1%).

Table 4.19 Number of other people using the same toilet

	Frequency	Percent	Valid Percent	Cumulative Percent	
1 – 5	7	4.3	23.3	23.3	
6 or more	23	14.1	76.7	76.7	
Total	30	18.4	100.0	100.0	
System	133	81.6			
	163	100.0			<0.003

4.12.6. Visible feacal residues in and around the drop hole or the drain

The observation of the pit latrine revealed that there were faecal residue on the drop hole as well as on the drain. There were 68.7% toilets visited that had faecal residue on the drop hole and around the toilet sit, while 30.7% of the toilets observed were clean in and around the drop hole and sit.

4.12.7. Cleaning material in toilet

There were 87.7% respondents toilets that had no anul cleansing materials such as toilet paper and hand washing basin as well as a brush for cleaning the toilet sit. The reesults also showed that 81.4% of thee respondents toilets had a bad smell and were unhygienic.

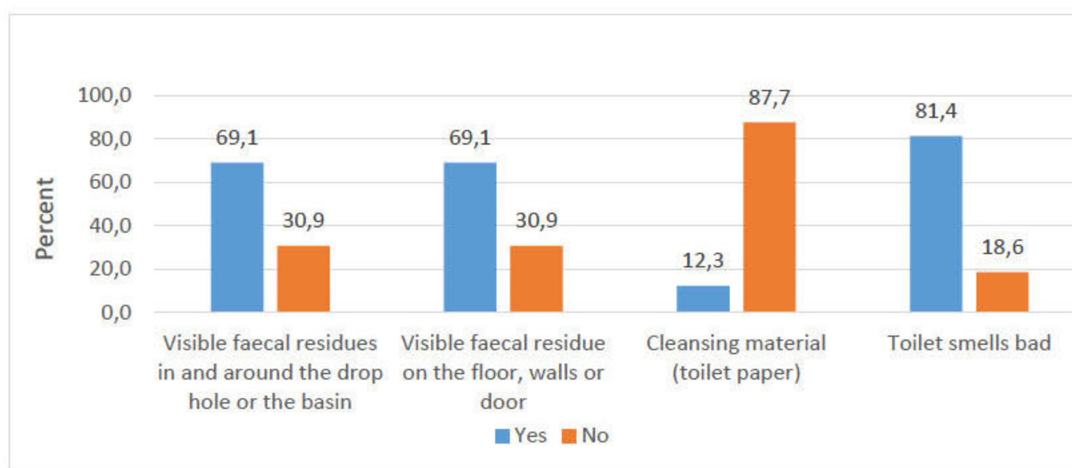

Figure 4.11 Hygiene status of the respondents households visited.

4.12.8. Pit latrine condition

Most of the pits were covered, (84.1%), however, only 24.2% toilets had lid covers, 10.6% of respondents households had soap for washing hands and only 6.8% had hand washing facilities.

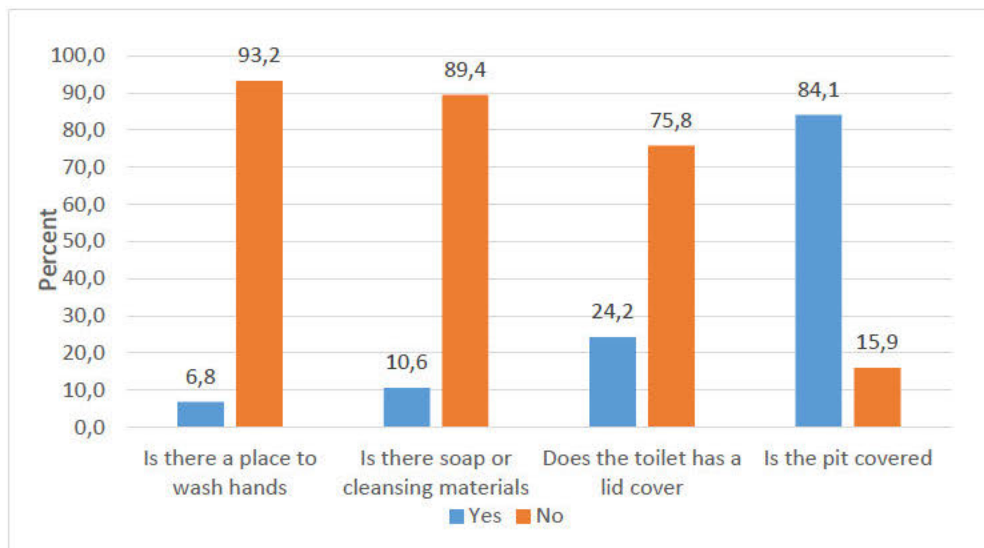

Figure 4.12 Percentages of households with hand washing facilities, soap, toilet lid covers and pit covers.

4.12.9. Pit latrines ventilation pipes

There were many pit latrines without ventilation pipes, which increases chances for the pits to smell and have bad odour.

Table 4.20 Pit latrine ventilation pipes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	54	33.1	34.8	34.8
	No	101	62.0	65.2	100.0
	Total	155	95.1	100.0	
Missing	System	8	4.9		
Total		163	100.0		

< 0.001

4.12.10. Respondents satisfaction with toilet facility

Most of the respondents were dissatisfied with their toilet facilities, (85.9%), with only 4.3% respondents revealing that they were satisfied with their toilet facility.

Table 4.21 Respondents satisfaction with household toilet

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Satisfied	7	4.3	4.3	4.3	
	Somewhat satisfied	8	4.9	4.9	9.3	
	Somewhat dissatisfied	7	4.3	4.3	13.6	
	Dissatisfied	140	85.9	86.4	100.0	
	Total	162	99.4	100.0		< 0.001
Missing	System	1	0.6			
Total		163	100.0			

4.13. STOOL MANAGEMENT FOR UNDER 5-YEAR-OLD CHILDREN

The respondents reported that 38% of the households visited, their children used the toilet to dispose their faeces, and 20.9% used potty, while 35.6% of the under five year olds were using diaper (disposable nappies) and 1.8% went to the yard to defecate.

Table 4.22 Stool disposal for children under 5 years

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Used toilet facility	62	38.0	38.0	38.0	
	Used a potty	34	20.9	20.9	58.9	
	Used disposable diapers	58	35.6	35.6	94.5	
	Went into the yard	3	1.8	1.8	96.3	
	Other	6	3.7	3.7	100.0	
	Total	163	100.0	100.0		< 0.001

4.14. SANITATION RELATED DISEASES IN THE COMMUNITY OF EZIMANGWENI

The study revealed that 28.8% of children under one year had had fever during and just before the study was conducted. The table below, 32 shows clearly the type of w sanitation related diseases prevalent in the community. However there was a signifint difference for runny nose/stuffy nose and congestion in the study.

4.14.1. Sanitation related diseases reported from all age groups

Table 2.23 Sanitation related diseases reported by respondents in Ezimangweni.

	Children under 1 year		Children 1 ≤ years < 5		Children 5 ≤ years < 15		Adults age 15 years or above		Chi Square p-value
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	
Fever	47	28.8	36	22.1	38	23.3	33	20.2	0.4184
Headache	31	19.0	28	17.2	39	23.9	43	26.4	0.2502
Constant cough	38	23.3	37	22.7	31	19.0	31	19.0	0.7415
Runny nose/ stuffy nose/congestion	33	20.2	31	19.0	20	12.3	16	9.8	0.0413
Panting/wheezing/difficulty breathing	16	9.8	15	9.2	15	9.2	12	7.4	0.8917
Vomiting	19	11.7	35	21.5	30	18.4	24	14.7	0.1443
Stomach ache	22	13.5	26	16.0	31	19.0	38	23.3	0.1808

There were 28.8% children under 1 year who were reported to have had fever, 26.4% children between ages of 1 and 5 years who were reported to have had headaches, 23.3% with constant cough, 20.2% with runny, stuffynose and congestion from children under 1 year, 9.8% with wheezing or difficulty breathing, 11.7% reporting with vomiting and 13.5% with stomach aches all children under 1 year.

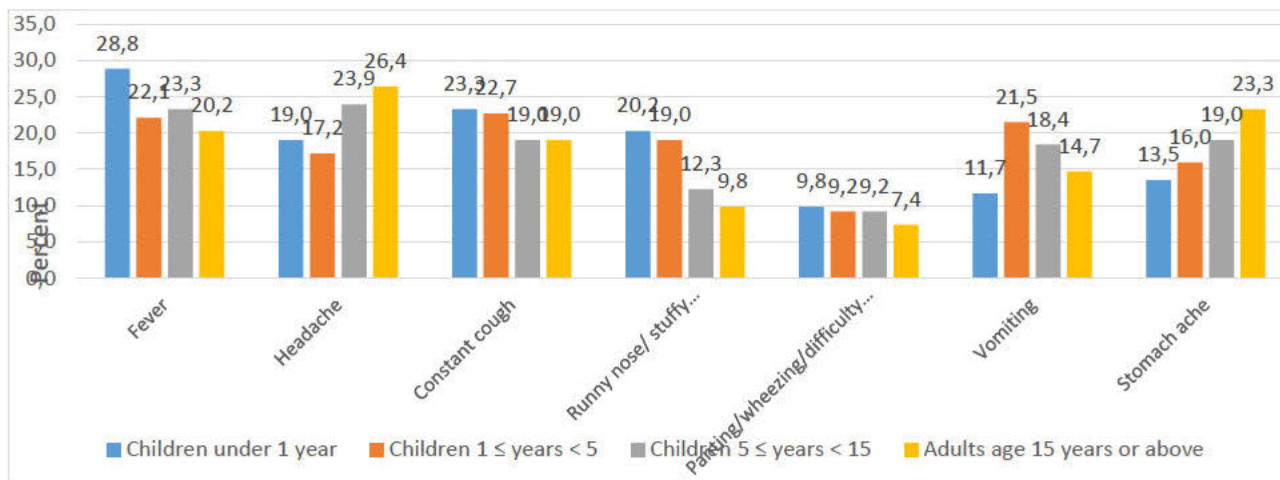

Figure 4.13 Diseases reported from all age groups

4.14.2. Hospitalization due to sanitation related diseases

The study found that 47.2% respondents family members were hospitalized due to water related diseases in the past year. The repondents revealed that some of their family members had been hospitalized due to either diarrhea, vomiting and or skin rashe,(47.2%) in the past year before the study.

Table 4.24 Hospitalization due to water related diseases (diarrhoea, vomiting and or skin rashes) amongst the respondents.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	77	47.2	47.2	47.2
	No	86	52.8	52.8	100.0
	Total	163	100.0	100.0	

<=0.481

The clinicians (Doctor and nurses) interviewd also mentioned that a number of sanitation and hygiene related diseases that they observe from the community of Inanda including Ezimangweni (table 38 and figure 15). All three clinicians agreed that diarrhea and blood in urine cases (100%) are seen from children seen in the Paediatrics department at Inanda CHC. While 66.7% with blood in stool, Dysentry (33.3%) and vomiting (33.3%) are also observed weekly from children seen at the paediatric department.

Table 4.25 Frequency of sanitation related diseases recorded at Inanda Community Health Centre.

	Yes	No
Blood in stool	66.7	33.3
Diarrhea	100.0	
Dysentery	33.3	66.7
Vomiting	33.3	66.7
Blood in urine	100.0	

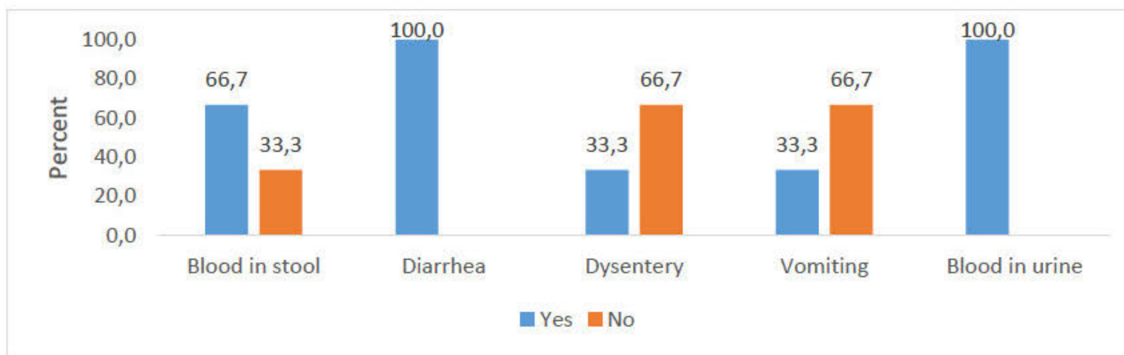

Figure 4.14 Sanitation related diseases recorded at Inanda Community Health Centre

The sanitation situation at Ezimangweni was reported as very bad by 2 (n-=3) Health professional interviewd at the nearest Community Health Centre (Inanda CHC). This was supported on table 40 where all clinicians agreed that they see ten or more children at the paediatric department with water and or sanitation related illnesses on a monthly base.

Table 4.26 Clinician (Doctor and Nurses) perspective on sanitation in Ezimangweni

Describe the status of sanitation in this area (Ezimangweni)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Getting worse	1	33.3	33.3	33.3
	Very bad	2	66.7	66.7	100.0
	Total	3	100.0	100.0	

Table 4.27 Daily diagnosis of sanitation related diseases

On average per month how many cases of children that you see who have poor sanitation and hygiene related illnesses?										
		Frequency	Percent	Valid Percent	Cumulative Percent				Frequency	Percent
Valid	Ten or more	3	100.0	100.0	100.0			Ten or more	3	100.0

4.15. SANITATION AND HYGIENE LEGISLATION IN SOUTH AFRICA

The respondents reported that they were not actively involved in the planning and implementation of service delivery projects in the area 48 (n=163). Many studies have reported that lack of public participation in sanitation and hygiene projects in their communities tend to discourage ownership and communities tend to neglect sanitation facility provided. Futhermore, the United Nation's SDG's acknowledge the need for involvement of local communities through target 6 (b) "support and strengthen the participation of local communities in improving water and sanitation management" (Bowlin and Hall, 2019:203).

Table 4.28 Service delivery project in Ezimangweni

		Frequency	Percent	Valid Percen	Cumulative Percent	
Valid	Yes	48	29.4	29.4	29.4	
	No	115	70.6	70.6	100.0	
	Total	163	100.0	100.0		< 0.001

The EThekwini municipality official and local Councilor disagreed on the question of whether water, sanitation and hgiene services had immproved since 2015, the municipality official from water and sanitation unit stating that in his opinion it has improved while the local Councilor saying it had not improved.

Table 4.29 Sanitation and hygiene in Ezimangweni

In your opinion, has water, sanitation and hygiene services improved since 2015?					
		Frequency	Percent	Valid Percen	Cumulative Percent
Valid	Yes	1	50.0	50.0	50.0
	No	1	50.0	50.0	100.0
	Total	2	100.0	100.0	

The study also showed the difering opinions on the multi-tier cooperation of government departments on sanitation delivery. The officials interviewed opined that was high (Water and Sanitation unit official) while the other suggested that it was medium (local Councilor).

Table 4.30 Opinion of government officials

Intergovernmental (National, Provincial, and Local) cooperation in sanitation delivery is…					
		Frequency	Percent	Valid Percen	Cumulative Percent
Valid	High	1	50.0	50.0	50.0
	Medium	1	50.0	50.0	100.0
	Total	2	100.0	100.0	

The local Councilor disagreed with the notion that sanitation provided in Ezimangweni was acceptable, he mentioned that the community was always complaining especially about the state of the toilets and the lack of good drainage to control water from houses.

Table 4.31 Opinion on sanitation in Ezimangweni

Do you think the condition in Ezimangweni is acceptable as far as sanitation and hygiene for the community?					
		Frequency	Percent	Valid Percen	Cumulative Percent
Valid	No Opinion	1	50.0	50.0	50.0
	Disagree	1	50.0	50.0	100.0
	Total	2	100.0	100.0	

The EThekwini officials both agreed that collaboration of all stakeholders on development of sanitation are important in providing sustainable sanitation and hygiene services in the community, as this approach will facilitate funding and resource allocation to fastrack project and guaranteed sustainability.

Table 4.32 Municipal officials perspective on multi-disciplinary cooperation on sanitation provision

What is your experience of the multi-tier and multi-departmental approach to sanitation delivery in mixed typologies of rural/peri urban/urban communities like Inanda?					
		Frequency	Percent	Valid Percen	Cumulative Percent
Valid	Can improve service deliver	1	50.0	50.0	50.0
	There are several positives	1	50.0	50.0	100.0
	Total	2	100.0	100.0	

4.16. SOLID WASTE MANAGEMENT IN EZIMANGWENI

Solid waste management is a crosscutting issue that touches and influences numerous areas of sustainable development, the affected areas include living conditions, public health, sanitation, marine and terrestrial ecosystems, and the sustainable use of natural resources. Out of the 17 SDG's atleast twelve of them and their pertinent objectives have a direct link to solid waste management (Rodic and Wilson,2017:2). Solid waste in Ezimangweni was seen as another main problem, as piles and piles of black plastic bags issued by the municipality were lying next to river systems and roads uncollected. Domestic aniamls (dogs) were seen scavenging them and rodents were also a usual sight on the areas. The community complained that private contructors were used to collect their waste either from skips or in plastics but they were never consistent in their collection.

CHAPTER FIVE
DISCUSSION

5.1. INTRODUCTION AND DISCUSSION

This chapter discusses the results found in chapter four and compares these results to similar studies conducted on field water, sanitation and hygiene, which have been gathered from both local and international literature in order to gain a better understanding of poor sanitation and hygiene affects communities in per-urban settings in the eThekwini Municipality. This research sought to measure poor sanitation and hygiene habits in the community of Ezimangweni in Inanda, eThekwini municipality. It was based at a peri-urban area of Ezimangweni in Inanda, EThekwini municipality in KwaZulu-Natal. The present study made use of questionnaires to collect data. The tool was a self-administered questionnaire in which demographics, type of sanitation provided, and prevalent water and sanitation related diseases were investigated to understand the respondents' satisfaction with type of sanitation provided.

The questionnaire response rate was 95%, which was higher considering that the research was conducted during peak of Covid-19 epidemic. According to Fincham, (2008:1), "response rate of approximately 60% should be a goal for research". The questionnaire was administered by the researcher to adhere to Covid-19 protocols and guidelines (Social distancing). Interview administered questionnaire assists the respondent in understanding instructions and provide encouragement to complete the questionnaire. Differences in literacy levels among the respondents is also addressed, (de Jong, 2016).

The majority of the respondents were females, with a greater number from those between thirty and forty years of age. Males made a smaller number of the respondents. There is also a greater number of respondents who were not employed, and a low number of respondents with matriculation and higher qualifications. There was a handful distribution of tertiary education ranging from the National Diploma, Bachelor's degree. Particularly, a small percentage of respondents only completed primary school. Abanyie, et al, (2022:7)," showed a convincing relationship between the importance of sanitation and the respondents' level of education, further suggesting that people's level of education significantly influences their awareness and the need for proper sanitation".

The study found that a significant number of respondents had matric followed by those with secondary level of education while a small number had diplomas and degrees. Many studies have revealed a strong link between education level in the community and sanitation,

Stephenson and Basu, (2005) states that “education, even very little of it, is the magic bullet for literally any kind of improvement in people’s lives”, while Sinanovic,(2005:639), also mentions that “ in the case of sanitation and education, while maintenance of toilets and facilities is critical, it is equally as crucial for people to be educated about the principles of proper hygiene and water usage that are applicable in their homes and community facilities”.

A quarter of the respondent’s earner between 1050 to 2050 rand per month, this was further reduced by the pandemic as many families lost income due to job losses because of lockdowns. There were only 28 of the 183 respondents earned above 4051 rand per month. The majority of respondents are earning below the minimum wage (R20 per hour, which translates to R3, 500 over 40 hour working week) as gazetted by Department of Employment and Labour. Unemployment plays a major role on sanitation, this is evident in the study as many respondents still dwell in the one rooms they were provided around 1995 as Reconstruction and Development Project houses. There are no proper site boundaries which makes it difficult for those residents who can afford to increase their house as their families grows.

The Constitution of the Republic of South Africa attributes the right to basic services (water and adequate housing) and these are intertwined with elements such as human dignity to all citizens. These form the baseline for subsequent national and local legislations surrounding basic services such as the Water Services Act of 1997, and the National Sanitation Policy (DWS, 2016). The mandate for the provision of these service is given to Water Service Authorities (Gounden & Alcock, 2017). However, they often struggle to reduce service backlog and balance pro-poor and pro-growth agendas (Sutherland et al., 2014). For example, pro-poor agendas highlight the importance of participation in service provision. However, as is evident below, in reality, residents have limited involvement, resulting in compromises tied to infrastructure. WASH infrastructure provision in South Africa is dynamic and continues to be varied, (Georgi, et al, 2021:440).
Ezimangweni is a peri-urban area, and additionally 50% of the world’s population are hosted in urban and peri-urban areas. However, many of these areas lack access to clean water and sanitation needed to ensure proper health and wellbeing. According to the WHO, 2019,” globally, about 2 billion people lack basic sanitation facilities”. Similarly, WHO, 2015, revealed “that in developing countries, the proportion of people lacking access to improved sanitation and drinking water is substantially higher”. For instance, in sub-Saharan Africa, 32% and 70% of people respectively lacked access to potable drink water and improved sanitation facilities. Many of these communities live in informal houses, and the study revealed that many respondents have lived in the area for 27 years in a one roomed dwelling, which has over the

years forced the family to build a shark or add one or two rooms to accommodate the increasing family. This has also impacted on the pit latrine which was also built 27 years ago.

There are still respondents that live in informal housing in the area, 1.8% out of the 98.2% living in either one roomed RDP houses or formal houses they built themselves.
The study also showed that overcrowding present in the area, as 21.5% respondents indicated that they were nine and above people in the house, that is 35 respondents reported that they are more than nine people living in the household. Nkosi et al, (2019**: 1**) explains that "household overcrowding has been associated with a range of ill-health outcomes, including acute respiratory infections and diarrhoeal diseases". This is supported by the fact that many households in Ezimangweni have either sharks linked to the main RDP house. The area has not been pegged to differentiate boundaries, therefore many households even though they can afford to extend their houses but they are restricted as they are not pegs to identify where their sites ends. Others have extended their houses due to increase in the family but they can no longer rebuild their pit latrines when they get full owing to lack of space.

According to National Water and Sanitation Master Plan, (2018) there are "14.1 million people do not have access to safe sanitation in their households". The type of sanitation that was provided for the community of Ezimangweni are pit latrines with a slab, these were built more than twenty years ago. The area (Ezimangweni) is a peri-urban area, no site or title deeds are available for the residents and therefore no clear boundaries between each household. The pit latrines are in a very bad state, as some were missing doors, no ventilation pipes, no roofs, and most were structurally damaged. The is a small percentage of households using flush toilets, however these were flushing to septic tanks and all the septic tanks were in an area that is not accessible by truck for emptying. One septic tank was already seeping to the neighbour yard and contaminating the pedestrian pathway.

The major problem observed in Ezimangweni as far as pit latrine is the issue of space to dig another latrine when one is full. The endervours by the Ethekwini municipality to contract privite companies to do the emptying has not alleviated the problem of contaminated stagnant water next to dwellings. Certain households reported that they have no sanitation facility, as they have dug all over their site and have to ask their neighbours to share with them. There is a draft guideline for dealing with full latrines that was developed by the South African Department of Water Affairs and Forestry. In the guideline, there are four options that should be followed when a pit is full, (i) abandon old pit and build another one, (ii) employ other methods to extend life of

the pit, such as adding water to the pit every day, mixing pit contents every six months or add biological agents) before emptying, (iii) empty pit manually, and (iv) remove accumulated sludge from the pit and appropriately treat it and or dispose. The study found that only 108 households visited had their pit latrines emptied, with 45 respondents reporting that their pits were never emptied. Thye, et al (20**0**9) argues that "neglecting pit emptying can lead to transmission of diseases like diarrhoea, outbreak of chlorella and can lead to high infant mortality". More than half 122 (n=163) of respondents reported that they were dissatisfied with their toilets and 22 revealed that they were very dissatisfied. While 138 (n=162) respondents rated quality of service they were receiving as poor.

EThekwini municipal practitioners were extensively celebrated for innovations in pricing, new product development, creative service delivery and on public participation. Though in a divided society as South Africa is, with her high degree of neoliberal public policy, numerous social, economic and environmental contradictions have reached deep into EThekwini's water and sanitation politics. Some parts of the city were neglected when it comes uneconomic water and sewage pipe extension. Tokenistic supply of water was given to poor people which leave them with one- third lower consumption levels (Bond, 2019: 275).

Water is located in the yard for 90.7% respondents while 7.4% had water connected to their houses and only 1.8% reported that they have no metres and have to collect water from their friends or relatives. The study also found that many respondents reported that they store water in plastic containers as 147 households reported that the water is located in their yards. In a study by Hubbard et al, (2020:5) found that "all households in the study reported having to store water and the high percentage of household stored water samples testing positive for the presence of *E. coli*, an indicator of faecal contamination ". A significant number of respondents (92%) revealed that they were many water leaks in the area, and 54.6% of the respondents reported that it usually takes three days or more for the EThekwini municipality to repair these water leaks. According to Erasmus, (2021) "Durban's water and sanitation head told Members of Parliament that the city experiences 400 leaks a day". Constant leakages pose health problems where pit latrine emptying and sewage leaking is unabated. Upfold, Luke and Knox, (2021:1), argues that "rapid urbanisation has led to human health hazard posed by enteric viruses particularly in Africa where an expansion of informal settlements with poor sanitation and failing or non-existent wastewater treatment infrastructure".

Strategies on hand hygiene involve washing hands with soap and water, however this is associated with a number of factors that act as a barrier to its use, such as requiring running water, and the need to dry hands after cleaning (Munn et al, 2020:1).
The study showed that 158 (n=162) of the respondents wash hands after using the toilet, while 4 (n=162) respondents reported that they sometimes forget or do not usually wash their hands after using the toilet, due to water being too far from the toilet. The study also revealed that only 21.4% reported to wash their hands before eating. Hand washing with soap after toilet use and before eating reduces the risk of death and disability due to diarrheal diseases from poor hygiene and sanitation (Qazi and Anwar, 2021:381). Adequate sanitation facilities are necessary part of achieving the rights to dignity and to an environment that is not harmful to health or well-being, as enshrined in the Bill of Rights of the Constitution (NWASMP: 2018:91).

There were households in the study who shared their pit latrines with their neighbours 28 (n=163). The results show that there are 4.5% of respondents who share their pit latrines with one to five members outside their household while 14.1% share with six and more members who do not have a pit latrine or their pit is full and unusable. Studies have stated "that full and or over flowing improved pit latrines do not meet the criteria safe, hygienic and sustainable sanitation systems" (Nakagiri et al, 2016:6). The issue of filling up rates in Ezimangweni is not investigated however, and many respondents complained that their pit were filling up very quickly. According to Nakagiri et al, (2016:2) "the use of pit latrines in urban areas of Sub-Saharan Africa has been marred by poor performance in terms of fast filling, bad smell and insect nuisance, which are associated with user dissatisfaction and a risk to disease transmission". Upon observation 112 pit latrines were found to have faecal residue in and around the drop hole, the same pits latrines also had faecal residue on floor, walls and on the door. The results reveals that 87.7% of the respondent's toilets had no cleansing materials such as toilet paper and 81.4% toilets had a bad smell. The results show that only 10.8% of respondent's toilets had soap for washing hands and only 6.8% were having hand washing facility inside the toilet. Water, sanitation and hygiene (WASH) factors are responsible for 11.4% of deaths in Zambia, making WASH a key public health concern (Nyambe and Yamauchi. 2021).
The study results showed that fever, headaches, stuffy/ runny nose, congestion and vomiting are the major illnesses reported by the respondents in the study, especially amongst the under one year olds and up till the under fifteen-year-old children. According to Warren-Gash, Fragaszy and Hayward, (2012:9), claims that "there was moderate–high-quality evidence that hand hygiene was associated with a large reduction in influenza and acute respiratory tract

infections in institutional settings (schools) and a domestic setting (squatter settlements) in two studies in low to middle-income countries". The respondents also reported that their family members have been hospitalized due to sanitation related diseases such as diarrhoea, vomiting and skin rashes in the past year before the study 77 (n=163). Thomas, Holbro and Young, 2013:18. Also found that "instances of scabies were much higher in villages with lower hygiene standards". The most affected being the children seen at the paediatrics department with diarrhoea, blood in urine, dysentery and blood in stool. Many studies have reported that uncovered drinking water containers were identified as a risk factor for diarrhoea in households in Dar Es Salaam, (Thomas, Holbro and Young, 2013:32, Shields, Bain, Cronk, Wright and Bartram, 2015:1227). In some areas grey water was seen stagnant and overflowing to poodles of water from dish washing, bathing and washing of clothes in the households. Improper management of solid, waste water and drainage could lead to odours, water contamination, mosquito breeding areas, causing infections and diseases like diarrheal diseases.

Sanitation policies have been promulgated in a number of countries in the Sub-Saharan Africa region. Most of these policies state broadly the different sanitation tools but lacking on minimun service for specific groups and procedural details, for instance, a review of policies from certain African countries revealed that only Mozambique, Ghana and South Africa had a Ventilated Improved Pit as their minimum sanitation standard (Nakagiri et al, 2016:7). The highest number of these policies do not cater for funding of sanitation technologies at the household level, and thus service delivery is normally done through multi-tier processes that involve various sectors in which on-site sanitation provision ends up being at domestic level and a responsibility of the individual households. Meanwhile, in 1994, and particularly after 2001, an estimated 5.15 million households have been provided with safe and acceptable sanitation facilities. The backlog in 1994 was estimated at 4 million households, whereas at April 2017 it is estimated that there are still 3.96 million unserved households. The South African population increased from around 40 million in 1994 to a total of 55, 6 million as recorded in the 2016 Census. Progress in the reduction of the backlog has been hampered by this substantial population growth and by households becoming smaller (hence, increasing at a faster rate than the population).

Urban migration has also shifted where the needs are. In addition, the facilities provided to households previously have become inadequate in some areas due to various factors including ventilated improved pit latrine (VIP) pits not being emptied regularly, ageing infrastructure, poor

facility operation and maintenance, and infrastructure operated above its design capacity(NWASMP:2018:92).

Regulation of the water and sanitation sector is extremely complex, with a large number of bodies responsible for different aspects of regulation. The primary regulation of the sector, however, is the responsibility of the Department of Water and Sanitation. Water services regulation is aimed at ensuring the provision of financially sustainable, reliable and universal water supply and sanitation provision, with a particular focus on ensuring affordable access to the poor. According to Water Aid, (2018:10), “there are four bottlenecks in the enabling environment for hygiene, inconsistent policy inclusion and limited available data, which means hygiene is completely overlooked, lack of a dedicated coordinating mechanism to ensure that championing of hygiene inclusion in sector processes and funding is at a greater level, integration of hygiene activities to health and education to ensure WASH policies, strategies and programmes are implemented at all levels and routine monitoring of hygiene programmes to ensure sustainability”.

CHAPTER SIX

RECOMMENDATIONS, LIMITATIONS AND CONCLUSIONS

6.1. RECOMMENDATIONS

The community of Ezimangweni and the rest of Inanda would profit from better integration and consolidated concept of WASH that coherently incorporates the various individual components namely; policy, planning and implementation frameworks, rather than dealing with each component in isolation. The community will also benefit from consistent, coordinated and

complementary indicators across clinical and service provision sectors that also help co-ordination between sectors. A point emphasized in this study is the need for increased importance of sanitation and hygiene promotion.

- A full study should be conducted to assess WASH implementation and strategies in the area of Inanda.
- Study to be conducted to ascertain the type of sanitation facility for the area of Ezimangweni as almost all the pit latrines have taken the available space in each household.
- There issue of drainage in Ezimangweni need attention as lack of proper drainage lead to further contamination of the soil due to seepage.
- The issue of leakages should be promptly addressed.
- Land ownership issues need to be looked into.
- The matter of housing needs to be addressed to improve household overcrowding.
- Community participation on WASH programmes should be improved
- Sanitation and hygiene education to be prioritised especially at local schools and at community level.

6.2. LIMITATIONS

The research was undertaken during the peak of Covid-19 epidemic and questionnaire had to be researcher administered to minimize contact and adhere to social distancing. The study only covered area one and two in Ezimangweni and care should be taken in generalising to the entire area of Inanda.

6.3. CONCLUSIONS

Sanitation services provision is a key requirement for the establishment of sustainable living, healthy communities and protection of the environment and to meet the human rights of all who live in South Africa. Sanitation infrastructure and good hygiene practices must enhance the principles of health, dignity and the protection of the environment, ensuring an improved quality of life for all, (National Water and Sanitation Master Plan, 2018:**90**). The results of the study are similar to findings by Kenneth, 2019:116, “that poor waste management,overcrawding, lack of consistent water supply, poor quality of buildings may lead to poor living conditions”.

The study has also revealed that poor sanitation and hygiene practices lead to transmission of diseases. Therefore, handa-washing with soap is one of the most cost effective interventions to prevent diarrhoea illness and prevent deaths. Many Children suffer a disproportionate share of the disease burden related to water, sanitation and hygiene. Therefore, by ensuring handwashing at critical times, up to 40 per cent of diarrhoea-related deaths, up to 47 per cent of all childhood diarrhoea cases, and up to 25 per cent of respiratory infections can be prevented(UNICEF,2017**).**

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APPENDICES

APPENDIX A 1

INTERVIEW QUESTIONS FOR MUNICIPAL OFFICIALS AND LOCAL COUNCILLOR INVOLVED IN SANITATION DELIVERY IN EZIMANGWENI IN INANDA, ETHEKWINI MUNICIPALITY

All information and disclosures are strictly confidential
Data shall only be used as part of research for master's degree in health sciences

1. DEMOGRAPHIC INFORMATION	
Name of department:	
Designation & experience within department:	
Characteristics of the department ((Department's role in the provision of sanitation services):	
Name of Respondent (optional)	

2. BACKGROUND & OVERVIEW

Basic sanitation services mean "provision of basic facility which is easily accessible to a household, the sustainable operation of the facility including the safe removal of human waste and wastewater from the premises where this is appropriate and necessary, and the communication of good sanitation hygiene and related practices" (Strategic Framework for Water Services, 2003: 92) to all citizens.

By definition the provision of basic sanitation service implies a multi-stakeholder interaction in enabling delivery. It implicitly implies coordinated efforts by a number of institutions including government departments at all spheres as well as private sector and community participation. Whilst Department of Water Affairs and Forestry (DWAF) is the regulatory body of water and sanitation services other departments play a pivotal role in ensuring effective and efficient sanitation delivery.

The purpose of this questionnaire is explore the interactive relations amongst various stakeholders in the provision of sanitation (generally countrywide as well as with specific reference to Ezimangweni community in Inanda, eThekwini Municipality)

3. INTER/MULTI-DEPARMENTAL ROLES IN SANITATION PROVISION

The Intergovernmental Relations Framework Act (Act 13 of 2005) defines the role of departments within national, provisional and local government as an 'interacting network of institutions' in promoting sustainable service delivery. This is particularly evident in the approach to sanitation provision to citizens of South Africa.

3.1 Describe the role of your department in sanitation provision in Ezimangweni (situated within EThekwini Municipality).

3.2. Briefly explain the types of programs being implemented by your Department or EThekwini Municipality relating to water and sanitation provision.

3.3. In your opinion, has water, sanitation and hygiene services improved since 2015?

4. INTER-GOVERNMENTAL CO-OPERATION AMONGST AND BETWEEN DEPARTMENTS IN ALL	**[Mark one with X]**

SPHERES					
4.1 Intergovernmental (National, Provincial, and Local) cooperation in sanitation delivery is…	High	Medium	Low	No comment	
4.2 Intergovernmental / departmental alignment of annual programs of action for sanitation provision is…	High	Medium	Low	No comment	
4.3 Collective harnessing of financial resources to ensure appropriate sanitation provision is…	High	Medium	Low	No comment	
4.4 Where does sanitation provision feature in your department's list of priority programs?	High	Medium	Low	No comment	
5. COLLABORATION & COMMUNICATION OF SANITATION PARTNERS	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
5.1 All departments work towards a joint common goal in sanitation delivery as per SDG targets of eradicating backlogs by 2030?					
5.2 What do you see as priorities on sanitation provision in the area?					
5.3 Do you think the condition in Ezimangweni is acceptable as far as sanitation and hygiene for the community?					
5.4 Does the municipality budget enough funds for sanitation and hygiene projects in the area?					

6. ROLE OF LOCAL GOVERNMENT IN SANTITATION GOVERNANCE. NAMELY ETHEKWINI MUNICIPALITY AS THE SERVICES AUTHORITY (SERVICING INANDA)	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
There is a need to:					
6.1 Increase participation of communities in sanitation delivery					
6.2 Strengthen partnerships between government and communities					
6.3 Increase dialogue between government and communities					
6.4 Strengthening accountability (of government) to communities					
6.5 Addressing local-level resource constraints					
6.6 Need to disseminate more information at community level around the following:					
6.6.1 Sanitation hygiene (personal)					
6.6.2 Use and maintenance of facilities					

6.6.3 Use and maintenance of public ablution facilities					
6.6.4 Developing capacity of local communities (broad based empowerment in Sanitation Job Creation Guidelines 2005).					
6.6.5 Engagement of communities around co-delivery of sanitation programme (community driven maintenance and operations).					
6.6.6 Communities awareness about opportunities to engage.					

7. COMMUNITY PARTICIPATION IN SANITATION DELIVERY	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
7.1 Community consultation is a primary planning approach					
7.2 In your experience; community partnership ensures successful programs implementation					
7.3 Community-driven programmes to ensures sustainability					
7.4 Community-driven processes instills a sense of ownership					
7.5 Communities cooperate willingly in the operations and management of facilities					
7.6 What are the specific community engagement initiatives operational in Ezimangweni, eThekwini?	**Kindly list and briefly explain:**				

8. KNOWLEDGE AND ATTITUDE ON SANITATION AND HYGIENE	**Kindly give a brief explanation:**
8.1 In your opinion, is there adequate clean running water in Ezimangweni?	
8.2 As far as you know, how long does it take municipality to fix water leaks?	
8.3 How many households do not have toilets in their homes in Ezimangweni?	
8.4 How often are pit latrines emptied in the area?	

9. WHAT IS YOUR EXPERIENCE OF THE MULTI-TIER AND MULTI-DEPARTMENTAL APPROACH TO SANITATION DELIVERY IN MIXED TYPOLOGIES OF RURAL/PERI URBAN/URBAN COMMUNITIES LIKE INANDA?

- **Kindly substantiate in as much detail as possible**
- **Provide specific examples where possible**

THANK YOU FOR YOUR TIME AND INVALUABLE CONTRIBUTION

APPENDIX A 2

INTERVIEW QUESTIONS FOR DOCTOR AND NURSES AT INANDA COMMUNITY HEALTH CENTRE

All information and disclosures are strictly confidential
Data shall only be used as part of research for Master's degree in health sciences

1. DEMOGRAPHIC INFORMATION	
Name of department:	
Designation & experience within department:	
Characteristics of the department (in the department's role in the provision of sanitation services):	
Name of Respondent (optional):	

Good morning/da/afternoon, I would like to ask you a few questions regarding the health impact of poor sanitation and hygiene in the community.

1. Have you receive children under the age of five years presenting with sanitation related illnesses in the past month?	Yes……………………1 No ……………………2 Not sure …………….. 3	
a. If yes, what was the diagnosis?	Multiple response-select all that apply Blood in stool………………………1 Diarrhea……………………………..2 Dysentery …………………………..3 Vomiting …………………………….4 Blood in urine ……………………... 5	
b. How often is this diagnosis or illness presented in this community	Weekly………………… 1 Monthly ……………….. 2 Less frequent……….... 3	
2. On average per month how many cases of children that you see who have poor sanitation and hygiene related illnesses?	Less than five……………………….1 Five to ten ………………………….. 2 Ten or more……………………….. 3 Not sure……………………………. 4	
3. Does your school Health Teams conduct Hygiene Education in surrounding schools or in the community?	Yes ……………………….1 No ………………………. 2 Do not know …………… 3	
4. Describe the status of sanitation in this area (Inanda)	Moderate………………. 1 Manageable.…………….. 2 Getting worse.………... 3 Very bad ………………. 4	
5. Does the facility provide hygiene education to all your patients on a daily base before seeing them or you wait for patients to present themselves with hygiene or water related diseases?	Yes…………………….1 No………………………. 2 Do not know…………… 3	

Thank you for your time and your contribution is invaluable.

APPENDIX B1

Questionnaire Number:……..

POOR SANITATION AND HYGIENE PRACTICES: A CASE STUDY OF EZIMANGWENI COMMUNITY IN INANDA, ETHEKWINI MUNICIPALITY.

Introduction

The 2030 Agenda4 comprises 17 Sustainable Development Goals (SDGs) and 169 targets addressing social, economic and environmental aspects of development and seeks to end poverty, protect the planet and ensure prosperity for all. Goal 6 aims to “Ensure availability and sustainable management of water and sanitation for all “and includes aspirational global targets for drinking water, sanitation and hygiene. Goal 1 also includes a target for universal access to basic services. UN Member States are expected to set their own targets “guided by the global level of ambition but taking into account national circumstances “and have selected the following indicators for global monitoring5.

Researcher

Surname:	First name:

SECTION A: HOUSEHOLD PROFILE

1. Age of participant (in years)

1. 18 – 30	3. 41 – 50	5. > 60
2. 31 – 40	4. 51 – 60	

2. Gender of participant

1. Male	2. Female	3. Other

3. Highest formal education level for members of your household?

1. None	3. Secondary school	5. Diploma
2. Primary school	4. Matric	6. Degree

4. Occupation of participant?

1. Unemployed	4. Business owner	7. Pensioner
2. Domestic worker	5. Manager	8. Other (specify)
3. Laborer	6. Professional	

5. Total income of household (in rands)?

1. < 500	3. 1051 – 2050	5. 3051 – 4050
2. 501 – 1050	4. 2051 – 3050	6. > 4051

Dwelling

6. Type

1. Formal dwelling	3. Shack / informal dwelling
2. Traditional hut	4. Other (specify)

7. Age of dwelling (in years)

1. < 1	2. 1 – 5	3. 6 – 10
4. 11 – 15	5. 16 – 20	6. > 20

8. How long have you been living in this house?

1. < 1	2. 1 – 5	3. 6 – 10
4. 11 – 15	5. 16 – 20	6. > 20

9. Number of people living in household?

1. One	3. Three	5. Five	7. Seven	9. Nine
2. Two	4. Four	6. Six	8. Eight	10. > nine

10. Do you pay property rates?

1. Yes	2. No

11. If yes, how much (in rands) do you pay per year?

1. 0 – 250	3. 451 – 650	5. 851 – 1050
2. 251 – 450	4. 651 - 850	6. > 1051

SECTION B: Sanitation Disposal

12. What kind of toilet facility do members of your household usually use?

Flush/pour flush
Flush to piped sewer system ......1 Flush to septic tank ......2 Flush to pit latrine ......3 Flush to open drain ......4 Flush to don't know where 5
Dry pit latrines
Pit latrine with slab ......7 Pit latrine without slab / Open pit 8
Composting toilets
Twin pit with slab ......9 Twin pit without slab ......10 Other composting toilet 11
Bucket 12
Container based sanitation ......13 Hanging toilet / hanging latrine 14
No facility / Bush / Field 15
Other (specify) 95

13. Where is this toilet facility located?

In own dwelling	1
In own yard/plot	2
Elsewhere	3

14. Emptying and disposal of excreta from sanitation facilities with on-site storage?

Has your (pit latrine or septic tank) ever been emptied?	Yes, emptied……………………………….1
	Never emptied……………………………..2
	Don't know………………………………….8

15. Disposal of excreta from onsite sanitation facilities

The last time it was emptied, where were the contents emptied to?	Removed by service provider to a treatment plant... 1 buried in a covered pit .... 2 to don't know where 3
	Emptied by household buried in a covered pit...................................... 4 to uncovered pit, open ground, water body or elsewhere…………………………………………….5
	Other (specify)……………………………………..6
	Don't know…………………………………………….8

16. Who empties your pit latrines? (If applicable)

1. Municipality	2. Family member	3. Private company
4. Hired laborer	5. Other (specify)	

17. When last was it emptied?

1. Less than a year ago	3. Five years ago	5. More than ten years ago
2. More than a year ago	4. Ten years ago	6. Don't know

18. Do you have communal toilets in your area?

1. Yes	2. No	3. Don't know

19. Did you pay anything for the installation of that system? If applicable

1. Yes	2. No	3. Don't know

20. How satisfied are you with toilet facilities?

1. Very satisfied	3. Neutral	5. Very dissatisfied
2. Satisfied	4. Dissatisfied	

21. Please give a reason for your answer

____

22. Are there any households with full waterborne flush system?

1. Yes	2. No	3. Don't know

23. Are there any communal toilets?

1. Yes	2. No	3. Don't know

24. What can you say about the quality of service you are getting

1. Poor quality	3. Good
2. Satisfactory quality	4. Don't' know

Water Services

25. What is your main source of water?

1. Piped water	4. Communal tap
2. Borehole	5. River or stream
3. Water tank	6. Water tanker

26. Where is that water collected from?

In own dwelling	1
In own yard/plot	2
Elsewhere	3

27. In the last month, has there been any time when your household did not have sufficient quantity of drinking water when needed?

Yes, at least once	1
No, always sufficient	2
Don't know	3

28. Are you satisfied with the water supply?

1. Very satisfied	3. Neutral	5. Very dissatisfied
2. Satisfied	4. Dissatisfied	

29. Please give a reason for your answer

____

____

30. Can you afford to pay for water for your household?

1. Yes	2. No

31. Are water leakages common in your area?

1. Yes	2. No	3. Don't know

32. If so, how long does it take for the municipality to repair it

1. Within one day	3. 2- 3 days
2. 1 – 2 days	4. > 3 days

33. Do you have other sources of water?

1. Yes	2. No

34. If yes, please state which type?

1. Rainwater	2. Groundwater

SECTION C: PAYMENT OF SERVICES

35. Do you pay for water and sanitation?

1. Yes	2. No	3. Don't know

36. How do you pay your Municipal Bill for water and sanitation?

1. Bank (deposit)	3. Municipal office	5. Retail Store

2. Bank (debit)	4. Post Office	6. Card

____

37. Do you afford to pay for your water and sanitation services?

1. Yes	2.No

SECTION D: COMMUNITY PARTICIPATION

38. Is there any community organization that is involved in the delivery of services i.e. water and sanitation?

1. Yes	2. No	3. Don't know

39. Are there any existing projects in your area that are aimed at addressing services delivery needs such as water and sanitation?

1. Yes	2. No	3. Don't know

SECTION E: GOVERNANCE AND CONTEXT

40. Are you aware of any projects occurring in your community with regard to the above services?

1. Yes	2. No

41. If yes, could you please describe these projects?

____
____
____

42. Who are the implementing partners?

1. Municipality	3. Private companies
2. CBOs	4. Other (specify):

43. What are your sources of information with regards to the municipality's service delivery?

1. Local councilor	3. Community media
2. Metro Beat	4. No sources

44. Do the communities have any input in the planning and implementation of service delivery projects?

1. Yes	2. No

45. If yes, how do they participate?

1. Ward forums	3. Civic structures
2. Political structures	4. Other (specify)

SECTION F: SANITATION HYGIENE EDUCATION & PRACTICES

46. Has anybody visited you to tell you about health and hygiene?

(Place **X** in selected box)

1. Who?	
2. When (date)?	

Please use the following symbols for your answer in the given space?

√ Yes, X for No

47. Do you use soap and water after you go to the toilet?

Yes		No	

48. How often do you clean your toilet?

1 Weekly	4 Every 3 months
2 Fortnightly	5 Not often
3 Monthly	6 Don't clean

49. What do you use to clean your toilet?

50. Do you share this toilet with others who are not members of your household?

Yes	No

51. If yes above, how many others people use this toilet?

1 – 5	6 and more

52. Care you show me your toilet facility.

Observe the following:

a. Visible feacal residues in and around the drop hole or the basin	Yes	No
b. Visible feacal residue on the floor, walls or door		
c. Cleansing material (toilet paper)		
d. Toilet smells bad		

53. Does the toilet have a ventilation pipe?

Yes	No

54. Observe the following about the toilet facility:

a. Is there a place to wash hands	Yes	No
b. Is there soap or cleansing materials		
c. Does the toilet has a lid cover		
d. Is the pit covered		

55. How satisfied are you with your household toilet facility?

Satisfied	1
Somewhat satisfied	2
Somewhat dissatisfied	3
Dissatisfied	4

56. When do you think it is important for young child (5 years and older) to wash their hands or have their hands washed?

Multiple responses – select all that apply	Before eating..1
	After eating.. 2
	After defecation................................. 3
	Other (Specify) …………………….……………. 4

57. Think about the last time a child member of your household under age 5 passed stools. Where did he or she defecate?

a. Used toilet facility	1
b. Used a potty	2
c. Used disposable diapers	3
d. Used reusable cloth diapers	4
e. Went into the yard	5
f. Other (specify)	6

58. Have any household members, under each of the following age groups, had any of these symptoms in the last month?

Age group	**a.**	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**
	Fever	Headache	Constant cough	Runny nose/ stuffy nose/congestion	Panting/wheezing/difficulty breathing	Vomiting	Stomach ache

Children under 1yr							
Children 1 ≤ yrs< 5							
Children 5≤age<15							
Adults age 15 or above							

59. Do your family members often get sick with stomach ache, diarrhea, vomiting, headaches, and skin rashes? If yes, how often?

1. Weekly ☐	4. Every year
2. Monthly ☐	5. Not often
3. Every six months	6. Other comment (Specify)

60. Has anyone in your household been hospitalized due to diarrhea, vomiting and or skin rash?

[√] Yes, [X] for No

61. If yes, how long was he/she hospitalized?

Few days		Few weeks		Month or more	

62. Do you have any other information regarding water and sanitation that you would like to share?

____

____

____

____

____

____

Thank you for your time.

APPENDIX B2

IMIBUZO NGESIZULU

Questionnaire Number:

POOR SANITATION AND HYGIENE PRACTICES: A CASE STUDY OF EZIMANGWENI COMMUNITY IN INANDA, ETHEKWINI MUNICIPALITY.

Introduction

The 2030 Agenda4 comprises 17 Sustainable Development Goals (SDGs) and 169 targets addressing social, economic and environmental aspects of development and seeks to end poverty, protect the planet and ensure prosperity for all. Goal 6 aims to "Ensure availability and sustainable management of water and sanitation for all "and includes aspirational global targets for drinking water, sanitation and hygiene. Goal 1 also includes a target for universal access to basic services. UN Member States are expected to set their own targets "guided by the global level of ambition but taking into account national circumstances "and have selected the following indicators for global monitoring.

Researcher

Surname:	First name:

SECTION A: HOUSEHOLD PROFILE

1. Iminyaka

1. 18 – 30	3. 41 – 50	5. > 60
2. 31 – 40	4. 51 – 60	

2. Ubulili

1. Male	2. Female	3. Other

3. Izinga lemfundo oliphumelele?

1. None	3. Secondary school	5. Diploma
2. Primary school	4. Matric	6. Degree

4. Uhlobo lomsebenzi owenzayo?

1. Unemployed	4. Business owner	7. Pensioner
2. Domestic worker	5. Manager	8. Other (specify)
3. Laborer	6. Professional	

5. Imali engenayo layikhaya ngenyanga?

1. < 500	3. 1051 – 2050	5. 3051 – 4050
2. 501 – 1050	4. 2051 – 3050	6. > 4051

Indawo yokuhlala

6. Uhlobo lwesakhiwo

1. Formal dwelling	3. Shack / informal dwelling
2. Traditional hut	4. Other (specify)

7. Ubudala besakhiwo (in years)

1. < 1	2. 1 – 5	3. 6 – 10
4. 11 – 15	5. 16 – 20	6. > 20

8. Usuhlale isikhathi esingakanani kulendawo?

1. < 1	2. 1 – 5	3. 6 – 10
4. 11 – 15	5. 16 – 20	6. > 20

9. Bangaki abantu abahlala kulelikhaya?

1. One	3. Three	5. Five	7. Seven	9. Nine
2. Two	4. Four	6. Six	8. Eight	10. > nine

10. Uyawakhokhela amarates?

1. Yes	2. No

11. Uma uthe yebo ngenhla, ukhokhamalini ngonyaka?

1. 0 – 250	3. 451 – 650	5. 851 – 1050
2. 251 – 450	4. 651 - 850	6. > 1051

SECTION B: MUNICIPAL SERVICES

Ukuqoqwa kwendle

12. Uhlobo **lwendawo yangasese**

Flush/pour flush
Flush to piped sewer system ....1 Flush to septic tank ....2 Flush to pit latrine ....3 Flush to open drain ....4 Flush to don't know where 5
Dry pit latrines
Pit latrine with slab 7

Pit latrine without slab / Open pit 8
Composting toilets
Twin pit with slab ....9 Twin pit without slab ....10 Other composting toilet 11
Bucket 12
Container based sanitation ....13 Hanging toilet / hanging latrine 14
No facility / Bush / Field 15
Other (specify) 95

13. Lakhiwe kuphi itoilet lakwakho?

Iingaphakathi endlini	1
Liseyadini noma lakho	2
Kwenye indawo	3

14. Ukuchithwa nokulahlwa kwendle ngaphakathi eyadini?

Ngabe lendlu yangasese seyake yachithwa indle kuyo?	Yebo…………………………………...1
	Ayikaze ………………………………..2
	Angazi………………………………..…8

15. Ukuchithwa kwendle kwizindlu zangasese ezisemagcekeni?

Uma yake yachithwa indle, yashoniswaphi?	Removed by service provider Yayiswa kwi treatment plant........................... 1 Yagqithwa egcekeni…..................................... 2 Angazi yalahlwa kuphi 3
	Emptied by household Nayigqiba engcekeni.. 4 Yagqithwa, yalahlwa egcekeni noma emanzini amile…………………………………………………5
	Enye indlela (Chaza)……………………………….6
	Angazi…..……………………………………………8

16. Ubani othulula indle uma umgodi usugcwele?

1. UMasipala	2. Ilunga lomndeni	3. Inkampani ezimele
4. Niqasha umuntu	5. Olunye uhlobo (chaza)	

17. Yagcina nini ukuthululwa indle kwindlu yakho yangasese?

1. Ngaphansi konyaka	3. Eminyakeni emihlanu eyedlule	5.Phezu kweminyaka eyishumi
2. Ngaphezulu konyaka	4. Eminyakeni eyishumi eyedlule	6. Angazi

18. Ngabe nazakhelwa ubani lezindlu zangasese kulendawo?

1. Umkhandlu WeTheku	2. Inkampani ezimele	3. Angazi

19. Nakhokha ngesikhathi nakhelwa lezindlu zangasese?

1. Yebo	2. Cha	3. Angazi

20. Wenelisekile ngohlobo lwezindlu zangasese kulendawo?

1. Very satisfied	3. Neutral	5. Very dissatisfied
2. Satisfied	4. Dissatisfied	

21. Ngicela ungiphe izizathu zempendulo yakho engenhla?

____

____

____

22. Ikhona imizi enezindlu zangasese ezisebenzisa amanzi ukuhambisa indle?

1. Yebo	2. Cha	3. Angazi

23. Zikhona izindlu zangasese zomphakathi kulendawo?

1. Yebo	2. Cha	3. Angazi

Water Services

24. Uwakha kuphi amanzi ansukuzonke??

1. Empompini	4. Kumpompi womphakathi
2. Epitsini	5. Emfuleni
3. Ethangini	6. Emotweni yamanzi

25. Uwakha kuphi amanzi okupheka?

1. Endlini	2. Egcekeni	3. Kwenye indawo

26. Kulenyanga edlule nike nabanayo inkinga yokungabikhona kwamanzi okuphuza uma niwadinga?

Yebo, kanye enyangeni	1
Cha, ahlale ekhona	2
Angazi	3

27. Wanelisekile ngokulethwa kwamanzi kulendawo?

1. Nganelisekile kakhulu	3. Ngimanqika	5. Angenelisekile nhlobo
2. Nganelisekile	4. Angenelisekile	

28. Ngicela ucacise impendulo yakho engenhla

____

____

29. Uyakwazi ukumelana nokukhokhela amanzi nyangazonke?

1. Yebo	2. Cha

30. Ngabe ukuvuza kwamapayipi amanzi kuvamisile kulendawo?

1. Yebo	2. Cha	3. Angazi

31. Kuthatha isikhathi esingakanani uMasipala ukuthumela kuzovalwa amapayipi avuzayo?

1. Ngaphansi kosuku	3. Ezintathu nangaphezulu
2. Usuku kuya kwezimbili	4 Ngaphezulu kwesonto

32. Ninayo enye indlela yokuthola amanzi ngaphandle kwasempompini?

1. Yebo	2. Cha

33. Uma uthi yebo, iyiphi leyondlela kwezingezansi?

1. Amanzi emvula	2. Amanzi esiphethu	3. Epitsini

SECTION C: PAYMENT OF SERVICES

34. Niyawakhokhela amanzi nokuthuthwa kwendle?

1. Yebo	2. Cha	3. Angazi

35. Niwakhokhela kuphi amanzi?

1. Bank (deposit)	3. Municipal office	5. Retail Store
2. Bank (debit)	4. Post Office	6. Card

36. Uyakwazi ukumelana nokukhokhela amanzi nokuqoqwa kwemfucuza?

1. Yes	2.No

SECTION D: COMMUNITY PARTICIPATION

37. Ingabe ikhona inhlangano yomphakathi esizayo ezintweni ezimayelana namanzi nenhlanzeko?

1. Yebo	2. Cha	3. Angazi

38. Ngabe ikhona imisebenzi eyenziwayo lapha endaweni ukuzosisa ukuxazulula ukuhamba kancane kokulethwa kwamanzi nenhlanzeko?

1. Yebo	2. Cha	3. Angazi

SECTION E: GOVERNANCE AND CONTEXT

39. Kukhona umsebenzi owenziwayo kulendawo ukuthuthukisa ukulethwa kwamanzi nokuthuthwa kwendle?

1. Yebo	2. Cha

40. Uma uthe yebo, ngabe amayelana nani lamaprojecti?

____
____–
____

41. Uma uthe Yebo ngenhla, ubani owenza lomsebenzi?

1. Umkhandlu weTheku	3. Izinkontileka ezizimele
2. Izinhlangano zomphakathi (CBO's)	4. Okunye (Chaza):

42. Niluthola kanjani ulwazi ngokulethwa kwentuthuko evela kuMkhandlu kulendawo?

1. Kwi Khansela lendawo	3. Umsakazo womphakathi
2. Kwiphepha loMkhandlu weTheku	4. Asilutholi

43. Ngabe umphakathi wakulendawo uyalibamba igqaza ezinqumnyweni zokuletha intuthuko kulendawo?

1. Yebo	2. Cha

44. Uma uthe yebo ngenhla, umphakathi ulibamba kanjani iqhaza?

1. Kumaforum omphakathi	3.Kwizinhlangano zomphakathi ezibheke intuthuko
2. Kwizinhlaka zePolitiki	4. Okunye (Chaza)

SECTION F: SANITATION HYGIENE EDUCATION & PRACTICES

45. Kukhona esebeke bafika ukuzonifundisa ngezempilo nenhlanzeko?

(Place **X** in selected box)

1. Kwakungubani?	
2. Kwakunini (date)?	

46. Uyazigeza izandla ngensipho uma uqeda kusebenzisa indlu yangasese?

47. Uyihlanza kangaki indlu yangasese?

5.1.1 Njalo ngesonto	5.1.4. Njalo emva kwezinyanga ezintathu
5.1.2. Emva kwamasonto amabili	5.1.5 Angiyihlanzi njalo
5.1.3. Njalo ngenyanga	5.1.6 Angiyihlanzi nhlobo

48. Usebenzisani ukuhlanza indlu yangasese?

49. Kukhona abanye abantu abasebenzisa lendlu yangasese abangebona abomndeni wakho

Yes	No

50. Uma uthe Yebo ngenhla, bangaki?

1. 1 - 5	2. 6 and more

51. Bengicela ukubona indlu yangasese.

Observe the following:

a. Visible fecal residues in and around the drop hole or the basin	Yes	No
b. Visible fecal residue on the floor, walls or door		
c. Cleansing material (toilet paper)		
d. Toilet smells bad		

52. Ngabe indlu yangasese inalo ipayipi lokukhipha ukunuka?

Yebo	Cha

53. Bheka ukuthi kukhona yini lokhu okulandelayo

:

a. Is there a place to wash hands	Yes	No
b. Is there soap or cleansing materials		
c. Does the toilet has a lid cover		
d. Is the pit covered		

54. Ngabe wenelisekile ngalendlu yangasese?

Satisfied	1
Somewhat satisfied	2
Somewhat dissatisfied	3
Dissatisfied	4

55. Ngabe kubaluleke ngani ukuhlanza izandla ebantwaneni abancane? (5 years and older)

Multiple responses – select all that apply	Before eating...1
	After eating... 2
	After defecation.. 3
	Other (Specify) ……………………..…………… 4

56. Ngabe niwalahla kuphi amakaka abantwana abaneminyaka emihlanu?

a. Used toilet facility	1
b. Used a potty	2
c. Used disposable diapers	3
d. Used reusable cloth diapers	4
e. Went into the yard	5
f. Other (specify)	6

57. Ukhona kumalungu akho omndeni oseke waba nalezimpawu ezingezansi?

Age group	**a.**	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**
	Fever	Headach e	Constant cough	Runny nose/ stuffy nose/congesti on	Panting/wheezing/difficulty breathing	Vomiting	Stomach ache

Children under 1yr							
Children 1 ≤ yrs< 5							
Children 5≤age<15							
Adults age 15 or above							

58. Ukhona emndenini wakho ophethwe ilezizifo, stomachache, diarrhea, vomiting, headaches and skin rashes? If yes, how often?

1. Weekly ☐	4. Every year
2. Monthly ☐	5. Not often
3. Every six months	6. Other comment (Specify)

59. Ngabe ukhona kumalungu omndeni wakho oseke walaliswa esibhedlela ngenxa yokukhishwa isisu, ukuphalaza noma ukuluma kwesikhumba?

[√] Yebo, [X] Cha

60. Uma uphendule wathi Yebo ngenhla,ngabe walaliswa isikhathi esingakanani?

Izinsuku ezimbalwa		Amasonto ambalwa		Inyanga nangaphezulu	

61. Kukhona ongathatnda ukukusho mayelana namanzi nokuthuthwa kwendle nenhlanzeko kulendawo?

Thank you for your time.

Appendix C1

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Mr. Zungezi Wiseman Thuthu, about the nature, conduct, benefits and risks of this 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 computerized 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, Zungezi W. Thuthu, herewith confirm that the above participant has been fully Informed about the nature, conduct and risks of the above 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 C2

ISIVUMELWANO

ISIVUMELWANO SOKUBAMBA IQHAZA KUCWANINGO LWEZIFUNDO

- Ngiyavuma ukuthi ungazisile owenza ucwaningo, Zungezi Thuthu, ngocwaningo uqobo, ukuziphatha, okuhle nokubi mayelana nocwaningo- inombolo emayelana nenqubo yocwaningo:…………………………………..
- Nami ngiyitholile, ngayifunda ngayiqondisisa imininingwane engenhla (imininingwane yobambe iqhaza) mayelana nocwaningo.
- Ngiyaqonda ukuthi imiphumela yocwaningo, okubalwa imininingwane yami, ubulili, iminyaka, usuku lokuzalwa, izinhlamvu zokuqala zamagama ami nemiphumela yokuhlolwa kuyoba ingxenye yocwaningo ngaphandle kokuveza igama lami nomaphi kulolucwaningo.
- Ngokubheka izidingo zalolucwaningo,ngiyavuma ukuthiumcwaningi angalufaka lonke ulwazi alutholile ngesikhathi socwaningo kwi-computer
- Ngiyazi ukuthi nomanini nginganquma ukungabi yingxenye yocwaningo, lokhu ngeke kudale ukuthi ngibandlululeke.
- Ngibe nethuba elanele lokubuza imibuzo (ngokwamingingaphoqiwe)ngazikhethela ngokwami futhi ngazimisela ukunika imvume yokubamba iqhaza kulolucwaningo.
- Ngiyazi ukuthi imiphumela emisha nebalulekile etholakale kulolucwaningo ibe ihlobene noma iqondene name ngiyokwaziswa ngayo

………………………..………………………..	………………………	………………………………..
Igama eliphelele lomcwaningi	Usuku	Sayina
……………………………………………….	………………………	…………………………………
Igama eliphelele lofakazi (Mayekhona)	Usuku	Sayina
……………………………………………….	……………………….	…………………………………
Amagamaaphelele obheke umntwana (Mayekhona)	Usuku	Sayina

Appendix D1

LETTER OF INFORMATION

TITLE OF THE RESEARCH STUDY: POOR SANITATION AND HYGIENE PRACTICES: A CASE STUDY OF EZIMANGWENI COMMUNITY IN INANDA, ETHEKWINI MUNICIPALITY

Principal Investigator/s/Researcher: Zungezi Thuthu (B-Tech in environmental health)

Co-Investigator/s/supervisor/s: Dr. Shanaz Ghuman (PhD, MPH, PGDip. TE) and Prof. CC Jinabhai (MBChB, MMed, MD)

Brief Introduction and purpose of the study:

Zungezi Wiseman Thuthu is doing research to assess the level of sanitation and hygiene practices amongst the community of Ezimangweni area. You are invited to participate in the study, which assesses the level of sanitation and hygiene behaviour from your community. We will be visiting your household over a period of three months. This is our first visit and we will appreciate your assistance in completing this questionnaire. We may also need to have a look around your household. You will be interviewed in a warm and friendly manner, in a language of your choice. In this study we want to assess the level of sanitation provided in your community as well as the knowledge of Wash programme in the community and the practise of hand washing at all times, hence, the issue of water availability will be mentioned.

No risks or discomfort is expected during the course of the study to those who decide to participate. Participants will only be expected to donate an hour of their time during the interviews and questionnaire sessions.

Benefits to the community is expected to be in the form of improving the role of adequate sanitation and good hygiene practise. The research will also influence the municipality to consider best options for sanitation provision in the area. You will also be informed of the results when the study is finished.

Participants can withdraw at any time during the course of the study.

There will be no monetary payment or any kind for participating in the study.

No payment will be expected from all participants to cover any cost for the study.

Efforts will be made to keep personal information confidential all times during the study. Households will be given Identity numbers. There will be no compensation in case of a research related injury.

Persons to Contact in the Event of Any Problems or Queries:

Supervisor: Dr. Shanaz Ghuman
Please contact the researcher (0813917912), my supervisor (0313732807) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the DVC: Research, Innovation and Engagement Prof S Moyo on 031 373 2577 or moyos@dut.ac.za.

APPENDIX D2

LETTER OF INFORMATION IN ISIZULU

Isihloko: Ucwaningo oluzohlaziya isimo kwizinhlelo zokuthuthwa kokungcola, nokuthuthwa kwendle kanye nenhlanzeko endaweni yaseZimangweni eNanda ngaphansi kukaMasipala weTheku.

Isingeniso: U Zungezi Wiseman Thuthu wenza ucwaningo oluzohlaziya izinhlelo zokuthuthwa kokungcola, ukuthuthwa kwendle nenhlanzeko endaweni yaseZimangweni eNanda ngaphansi kukaMasipala weTheku. Niyacelwa ukuthi nibambe iqhaza kulolucwaningo oluzobheka ukubakhona kwengqalasizinda yo kuhlinzeka umphakathi ngamathoyilethi, amanzi, ukuhlanzeka okuhambisana nokugeza izandla kanye nokuqoqwa kwemfucuza. Sizovakashela amakhaya enu izinyanga ezintathu ezizayo. Namhlanje kungokokuqala lokhukuvakasha. Siyanicela ukuthi nisisize ekugcwaliseni lemibuzo ehleliwe esephepheni. Ekuvakasheni kwethu okuzayo siyophinde sicele ukungena emakhaya enu, sicele ukubuka nje isimo enihlala ngaphansi kwaso. Ngokuzayo niyobuzwa imibuzo ehleliwe ngentokomalo nobungani, imibuzo iyobe ibuzwa ngolimi lwakho.

Kulolucwaningo sifuna ukubheka kabanzi indlela okulahlwa ngayo indle, inhlanzeko kanye nokuqoqwa kukadoti.

Abukho ubungozi kuwena ngokubamba iqhaza kulolucwaningo.

Umvuzo ekubeni kulolucwaningo elokuthi uyosisiza ukwenzeni izinqumo mayelana nohlobo lwenqalasizinda yokuthuthwa kwendle, imfucuza nenhlanzeko. Uyonikezwa imiphumela yocwaningo uma seluphothuliwe.

Ukubamba iqhaza kungukuzinikela, uvumelekile ukuyeka noma yingasiphi isikhathi kulolucwaningo.

Akukho okutholakalayo ngokubamba iqhaza kulolucwaningo, ngaphandle kwesikhathi sakho uphendula imibuzo yomcwaningi.

Imizamo iyokwenziwa ukuqinisekisa ukuthi imininingwane yakho ihlala iyimfihlo.

Imininingwane ngomcwaningi

Umeluleki wocwaningo: Dr. Shanaz Ghuman
Ucingo lomcwaningi (0813917912), (0313732807) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the DVC: Research, Innovation and Engagement Prof S Moyo on 031 373 2577 or moyos@dut.ac.za.

APPENDIX E1

LETTER OF PERMISSION TO CONDUCT RESEARCH

Mr Zungezi W Thuthu
Durban University of Technology
Department of Health Sciences
Durban

17 January 2020

Request for Permission to Conduct Research

To:Inanda C Community Health Centre Institutional Management

Dear Sir/ Madam

My name is Zungezi Thuthu, a Masters in Health Science student (Reg no.20203014) at the Durban University of Technology. The proposed title for my research project is: **Poor Sanitation and Hygiene Practices: A case of Ezimangweni in Inanda, EThekwini Municipalit.**

Objectives of the study are:

- To examine the knowledge of the community regarding health and hygiene practices.
- To identify root causes of poor sanitation in Ezimangweni.
- To assess challenges faced by community regarding sanitation services.
- To suggest corrective measures to address sanitation problems in Ezimangweni. (to design an educational pictorial booklet/pamphlets in isiZulu)

I hereby seeking your consent to allow me to interview your staff (two nurses and a Doctor) working at the Paediatrict department few questions regarding impact of poor sanitation and hygiene amongst children under five years residing in Ezimangweni Area 1 to Area 3 (see attached list of questions appendix G).

I have provided you with a copy of my proposal which includes copies of the data collection tools and consent and/ or assent forms to be used in the research process.

Your support and permission to conduct the interviews at your facility will be highly appreciated.

If you require any further informatio, please do not hesitate to contact me [0813817912, zungezitutu@gmail.com].

Yours sincerely

Zungezi Thuthu

………………………..	………………………..	……………………………
ZW Thuthu (Mr)	S Ghuman (Dr)	CC Jinabhai (Prof)
Masters student	Supervisor	Co-supervisor
Cell: 0813817912	Tel: 031 3732807	0313778991
Email: zungezitutu@gmail.com	Email:shanazg@dut.ac.za	Email: n.jinabhai@gmail.com

APPENDIX E2

Inanda CHC approval letter to conduct research

health

Department:
Health
PROVINCE OF KWAZULU-NATAL

Postal Address: Private Bag x04 , Phoenix, 4080
PhysicalAddress: C135 Inanda Newtown, INANDA
Tel 031-5190455 Fax: 031-5190460 Email:ntombi.khuzwayo@kznhealth.gov.za

INANDA'C' CHC

Date: 17/01/2020
Enq: Dr Ntuane MA

Mr Zungezi W Thuthu
H 34 Umkhukhuze Walk
Ntuzuma Township
4359

RE : PERMISSSION TO CONDUCT RESEARCH AT FACILITY

I have pleasure in informing you that permission has been granted to you by the Facility to conduct research on Poor sanitation and Hygiene Practices: A case study of Ezimangweni Community in Inanda , Ethekwini Municipality

Please note the following;

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to the research.

2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN department of Health.

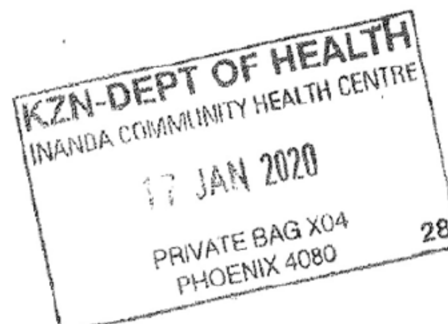
3. Please ensure this office is informed before you commence your research.

4. The District Office /Facility will not provide any resources for this research.

5. You will be expected to provide feedback on your findings to the District Office/Facility.

Thanking you.

Sincerelv



Dr Ntuane MA
Acting Medical Manager

APPENDIX E3

LETTER OF PERMISSION TO CONDUCT RESEARCH

Mr Zungezi W Thuthu
Durban University of Technology
Department of Health Sciences
Durban

10 March 2020

Request for Permission to Conduct Research

To:EThekwini Water and Sanitation

Dear Sir/ Madam

My name is Zungezi Thuthu, a Masters in Health Science student (Reg no.20203014) at the Durban University of Technology. The proposed title for my research project is: **Poor Sanitation and Hygiene Practices: A case of Ezimangweni in Inanda, EThekwini Municipalit.**

Objectives of the study are:

- To examine the knowledge of the community regarding health and hygiene practices.
- To identify root causes of poor sanitation in Ezimangweni.
- To assess challenges faced by community regarding sanitation services.
- To suggest corrective measures to address sanitation problems in Ezimangweni. (to design an educational pictorial booklet/pamphlets in isiZulu)

I hereby seeking your consent to allow me to interview your staff (Senior Official in Water and Sanitation) on challenges faced by your department in addressing sanitation and hygiene in Ezimangweni Area 1 to Area 3 (see attached interview guide appendix A).

I have provided you with a copy of my proposal which includes copies of the data collection tools and consent and/ or assent forms to be used in the research process. Your support and permission to conduct the interviews at your facility will be highly appreciated. If you require any further informatio, please do not hesitate to contact me [0813817912, zungezitutu@gmail.com].

Yours sincerely Zungezi Thuthu

....	....	....
ZW Thuthu (Mr)	S Ghuman (Dr)	CC Jinabhai (Prof)
Masters student	Supervisor	Co-supervisor
Cell: 0813817912	Tel: 031 3732808	0315778991
Email: zungezitutu@gmail.com	Email:shanazg@dut.ac.za	Email: n.jinabhai@gmail.com

APPENDIX E4
EThekwini Water and Sanitation approval letter

Trading Services Cluster

Water & Sanitation Unit

3 Prior Road,

Durban, 4001

PO Box 5588, Durban, 4000

Tel: 031 311 1111, Fax 031 311 88225

Our Ref. : DUT
Date : 05 August 2020
Contact : T Gounden
Telephone : 031 311 8793

THICS COMMITTEE: DURBAN UNIVERSITY OF TECHNOLOGY

TO WHOM IT MAY CONCERN

Re: **Permission to conduct research at eThekwini Municipality's Water and Sanitation Unit**

This letter serves to grant Mr. Thuthu Zungezi ID No. 7303285313087, a student at the Durban University of Technology , Student No.20203014, permission to conduct research for his research topic entitled "**Poor Sanitation and Hygiene Practices: A case study of Ezimangweni community Inanda ,Ethekwini Municipality"** Please note that for the purposes of accessing official documents and reports, and interviewing City Officials, you will approach them directly and participation is on a voluntary basis. Conducted the study within the ambit of good research and ethics as laid down by the University and include confidentiality and anonymity where necessary.

We wish you well in your research endeavor. Kind regards

Teddy Gounden - Water & Sanitation Unit: Strategic Executive

APPENDIX E5

LETTER OF PERMISSION TO CONDUCT RESEARCH

Mr Zungezi W Thuthu
Durban University of Technology
Department of Health Sciences
Durban

17 January 2020

Request for Permission to Conduct Research

To:Mr T. Mabanga (Ward 107 Councillor)

Dear Sir

My name is Zungezi Thuthu, a Masters in Health Science student (Reg no.20203014) at the Durban University of Technology. The proposed title for my research project is: **Poor Sanitation and Hygiene Practices: A case of Ezimangweni in Inanda, EThekwini Municipalit.**

Objectives of the study are:

- To examine the knowledge of the community regarding health and hygiene practices.
- To identify root causes of poor sanitation in Ezimangweni.
- To assess challenges faced by community regarding sanitation services.
- To suggest corrective measures to address sanitation problems in Ezimangweni. (to design an educational pictorial booklet/pamphlets in isiZulu)

I hereby seeking your consent to allow me to interview you on challenges faced by the community of Ezimangweni and the EThekwini Municipality in addressing sanitation and hygiene in Ezimangweni Area 1 to Area 3 (see attached interview guide appendix A).

I have provided you with a copy of my proposal which includes copies of the data collection tools and consent and/ or assent forms to be used in the research process.

Your support and permission to conduct the interviews at your facility will be highly appreciated.

If you require any further informatio, please do not hesitate to contact me [0813817912, zungezitutu@gmail.com].

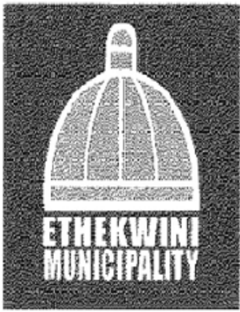
Yours sincerely

Zungezi Thuthu

…………………………… . ……………..…………….. ………………………………

ZW Thuthu (Mr)	S Ghuman (Dr)	CC Jinabhai (Prof)
Masters student	Supervisor	Co-supervisor
Cell: 0813817912	Tel: 031 3732808	0315778991
Email: zungezitutu@gmail.com	Email:shanazg@dut.ac.za	Email: n.jinabhai@gmail.com

APPENDIX E6
Local Councillors letter of approval to conduct research in Ezimangweni



To Whom it May Concern

DATE : 17/01/2020

Enq : Cllr T.N. MABANGA

MR Zungezi W. Thuthu
H34 uMkhukhuze Walk
Ntuzuma Township
4359

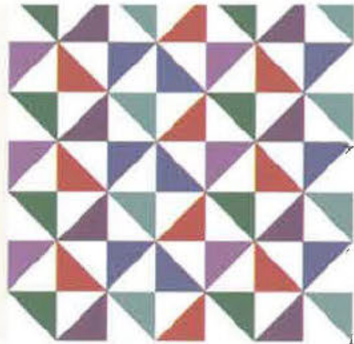
Re : PERMISSION TO conduct Reserch at eZimangweni Inanda

I have pleasure in informing You that permission has been granted to conduct research on "Poor Sanitation and Hygiene Practices; A case Study of Ezimangweni Community in Inanda, EThekwini Municipality."

Please note the following;
You will be expected to provide feedback on Your findings ~~to~~ . . . . -illors office

Councillor Thandanani Njabulo Mabanga
0763015888

APPENDIX F



Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

9 December 2020

Mr Z W Thuthu
H 34 Umkhukhuze Walk
Ntuzuma Township
4359

Dear Mr Thuthu

Poor Sanitation and Hygiene Practices: A case study of Ezimangweni community in Inanda, EThekwini Municipality
Ethical Clearance Number IREC 071/20

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

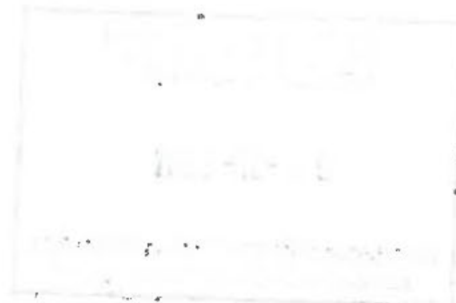
We are pleased to inform you that the data collection tool has been approved. Kindly ensure that participants used for the pilot study are not part of the main study.

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 IREC according to the IREC Standard Operating Procedures (SOP's).

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely,



Professor J K Adam
Chairperson: IREC