RADIATION THERAPISTS' EXPERIENCES OF DISRUPTIONS IN RADIOTHERAPY SERVICE DELIVERY DURING THE COVID-19 PANDEMIC AT PUBLIC ONCOLOGY HOSPITALS IN KWAZULU-NATAL, SOUTH AFRICA.

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Dissertation submitted in fulfilment of the requirements for the Master of Health Sciences in Radiography in the Faculty of Health Sciences at the Durban University of Technology

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Date : November 2023

Declaration

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entirely my own and not that of any other person, unless explicitly acknowledged (including citation of published and unpublished sources).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

___ ___01/12/2023_____

Signature of student Date

Approved for final submission

_ _____ __01/12/2024_____

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PhD: Health Sciences, MBL,
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Abstract

Background

The novel coronavirus (COVID-19) rapidly impacted all human life following its escalation to a pandemic status in early March 2020. This viral pandemic severely affected the world's developed and developing countries, resulting in disruptions within healthcare delivery systems, including radiotherapy. Although the government guidelines and restrictions to mitigate the risk of viral transmission were implemented, radiotherapy departments were amongst multiple departments forced to promptly adjust in order to encourage continuous clinical care. However, to provide this service, radiation therapists work closely together and in close proximity to their patients. These inherent working conditions resulted in changes in the number of treatments for some patients, clinical working patterns and conventional radiotherapy practice during the pandemic era. This challenge was faced by numerous radiotherapy departments globally, hence there is a need to explore how radiation therapists in South Africa coped to ensure continuous clinical service delivery.

Aim

The aim of this study was to explore radiation therapists' lived experiences of the COVID-19 pandemic disruptions on their radiotherapy service delivery at public oncology hospitals in the KwaZulu-Natal (KZN) province, and ultimately recommend strategies to support them to cope with the changes due to the pandemic.

Methodology

To conduct this research, the researcher employed a constructivist paradigm and a qualitative phenomenological approach. Criterion purposive sampling was used to select two public oncology hospitals, whereby the critical case sampling selected a radiotherapy manager as well as simulator, planning and treatment machine radiation therapists from each to constitute a minimum sample size of ten.

Findings

The study interview data was analysed using Colaizzi's Seven-step Method of data analysis to identify themes which were then presented as findings. This resulted in four major themes that revealed the radiation therapists' common narrative during the COVID-19 pandemic as: Changes in hospital settings, working conditions, radiation therapists' practices and wellbeing; barriers to radiotherapy service delivery; facilitators to radiotherapy service; and support needed.

Conclusion and recommendations

In exploring radiation therapists' lived experiences of disruptions in radiotherapy service delivery in a developing country such as South Africa, there can be strategies that aid in supporting radiation therapists to continue providing clinical service delivery. As part of the recommendations to attain this, the study brought forth managerial training, similar study conduction to validate study, interviewing of patients, psychological support to employees concerned, educational programmes for both patients and employees, remote treatment planning for radiation therapists, as well as routine screening for concerned employees.

Key-words

COVID-19 pandemic, radiation therapists, disruptions, clinical service delivery, experiences, hindrances

Dedication

I dedicate this dissertation to my loving mother, my immediate family, and my best friend- Thank you for your undying support, words of encouragement, and for allowing me to draw strength from you to complete this degree.

and

Not forgetting, a special dedication to my fiancé, who supported me so much during the course of this project. A special feeling of gratitude to my son, Lwakho Sithole, whom I birthed during the course of this study. His existence serves as encouragement to me and will always be a push for tenacity through this and any of my future endeavours.

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Glossary of Terms

COVID-19 pandemic: The coronavirus disease 2019 (COVID-19) pandemic is a global outbreak of the coronavirus, - an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Khan *et al.* 2020: 2).

Radiation therapists: Radiation therapists are part of an interdisciplinary team responsible for accurate treatment delivery of radiation dose, the clinical care and support of cancer patients on a daily basis throughout all preparation and treatment phases (Coffey, Naseer, and Leech 2022: 59).

Disruptions: These are defined by Cohen *et al.* (2022: np) as deviations from the natural progression of an operation, thereby potentially compromising the safety of the operation.

Clinical service delivery: The superior healthcare service that hospitals are obligated to give to patients (Manzoor *et al*. 2019: 2).

Experiences: An experience is defined as the interaction of an organism with its environment or as something that is acquired over time (Busacchi, Nieddu, and Michael 2022: 2).

Hindrances: Something that stops or delays the progress of an event (Horváth and Szabó 2019: 122).

List of Acronyms

COVID : Coronavirus disease

LINAC : Linear accelerator

WHO : World Health Organization

HPCSA : Health Professions Council of South Africa

KZN : KwaZulu-Natal

UK : United Kingdom

MDT : Multidisciplinary

CT : Computed Tomography

US : United States

IHSD : Initiative for Health and Social Development

PPE : Personal Protective Equipment

CEO : Chief Executive Officer

SARS-CoV-2 : Severe acute respiratory syndrome coronavirus 2

HDI : Human Development Index

CHAPTER 1: OVERVIEW OF THE STUDY

1.1 INTRODUCTION AND BACKGROUND TO THE STUDY

Radiotherapy is used for the treatment of cancer with the intent to cure, alleviate cancer symptoms or to prevent cancer spread to an organ of spread (Baskar *et al.* 2012: 195), and to ultimately improve patients' quality of life. Radiation therapists are healthcare professionals involved in delivering the radiotherapy service in the treatment of cancer. They provide this cancer care by locating the cancer, planning the treatment, treating the patient, and managing the radiotherapy department to ensure effective radiotherapy service delivery (Merchant, O'Connor and Halkett 2017: np). To ensure the efficacy of this radiotherapy service and the patient's safety, it is imperative to ensure high reproducibility when positioning the patient for treatment (Guo *et al.* 2020: 1). To fulfil this obligation, radiation therapists come into contact with cancer patients to position and immobilise them for the reproducibility of the treatment area and efficiency of treatment (Guo *et al.* 2020: 2). This is carried out over a period of several days or several weeks, and most patients often do not require hospitalization, only travelling to hospitals (Ambroggi *et al.* 2015: 1380).

In the late months of 2019, the outset of the Coronavirus-19 disease (COVID-19) resulted in significant burdens on the healthcare industry globally, including oncology (Anderson *et al.* 2020: 1). An explanation by Desta *et al.* (2021: 1) highlighted that the COVID-19 pandemic has caused significant disruptions in health service delivery. A previous study indicated that this changed the healthcare setting and increased the responsibilities relating to patient care by healthcare professionals (Chersich *et al*. 2020: 3), ultimately resulting in increased levels of stress, compromised general well-being, and changes in clinical service delivery amongst radiation therapists (Shanahan and Akudjedu 2021: 111). Dramowski *et al*. (2020: 1) further explained that previous data shows that part of this impact is high infection, morbidity and mortality, as well as distress and anxiety for these healthcare workers. Taking

into consideration the significant role of radiation therapists in delivering an optimal radiotherapy service, it is imperative to provide support to radiation therapists in order to ensure that they continue delivering the essential radiotherapy service. According to Desta *et. al* (2021: 2), the failure to provide support and protect these professionals will result in a more compromised radiotherapy service delivery, especially in developing countries where radiation therapists are limited.

To comprehend radiotherapy service delivery and the support required by radiation therapists during COVID-19, the current study aimed to explore the radiation therapists' experiences of the disruptions in radiotherapy service delivery during the ongoing COVID-19 pandemic in developing countries, particularly South Africa. The study was guided by Kurt Lewin's Change Theory (Kaminski 2011: np) and a conceptual framework based on the literature review of previous studies pertaining to the impact of COVID-19 on hospital settings, healthcare professionals, and working conditions (Wei *et al*. 2020: 204; Chersich *et al*. 2020: 3; Malicki *et al.* 2020: 821).

1.2 PROBLEM STATEMENT

The COVID-19 outbreak has caused a detrimental shift in the world's healthcare systems (Wei *et al* 2020: 205), including radiotherapy. The authors further explained that upon its emergence, the disease spread rapidly throughout the globe, extensively affecting healthcare systems as well as its professionals' overall well-being. For example, a study in the United Kingdom (UK) reported an increase in radiotherapy treatments for some cancers as a compensate modality for reduced surgical activities (Spencer *et al.* 2021: 309). Studies in Australia also reported changes to clinical working patterns and service delivery due to COVID-19 (Shanahan and Akudjedu 2021: 111) and conventional radiation therapy practice (Anderson *et al.* 2020: 243). Despite those challenges, radiation therapists continued to provide the radiotherapy service (Malicki *et al.* 2020: 823). The same authors maintained that, consequential to the ongoing pandemic, numerous radiation oncology centres around the globe had implemented precautionary measures aimed at facilitating optimal service delivery and patient care.

According to Fadden *et al.* (2021: n.p) and De Kock *et al.* (2021: 15-16), in order to ensure ongoing optimal service delivery and patient care, radiation therapists need to be supported to deal with the potential increase in demand for services carried through to the post-pandemic world. However, there is a paucity of information regarding the changes in radiotherapy service delivery by radiation therapists as a result of COVID-19 and the support needed to provide an ongoing quality radiotherapy service during the ongoing COVID-19 in developing countries, including South Africa. The current study filled this gap.

1.3 AIM OF THE STUDY

The study aimed to explore radiation therapists' experiences of the COVID-19 pandemic disruptions on their radiotherapy service delivery at public oncology hospitals in the KwaZulu-Natal (KZN) province, and recommend strategies to support them to cope with the changes due to the pandemic.

1.4 RESEARCH QUESTIONS

The study was guided by the following questions:

1.4.1 Main research question

What are radiation therapists' experiences of disruptions in radiotherapy service delivery at public oncology hospitals in the KZN province during the ongoing COVID-19 pandemic?

1.4.2 Sub-questions

- What are radiation therapists' perceptions of radiotherapy service delivery at public oncology hospitals during the ongoing COVID-19 pandemic?
- What are the facilitators to radiotherapy service delivery by radiation therapists at public oncology hospitals during the COVID-19 pandemic?

- What are the hindrances to radiotherapy service delivery by radiation therapists at public oncology hospitals during the COVID-19 pandemic?

- What strategies can be recommended to support radiation therapists to deliver optimal radiotherapy service during the ongoing COVID-19 pandemic?

1.5 SIGNIFICANCE OF THE STUDY

By exploring the lived experiences of radiation therapists, the onset and currently ongoing COVID-19 pandemic, this study aimed to shed insight on the disruptions in clinical service delivery in the radiotherapy setting. To validate the value of this study, the researcher had to expand the area of interest to public hospitals in KZN. In so doing, the information gathered is deemed pivotal to radiation therapists practicing throughout the country as the study entails a broader sample of oncology hospitals in a developing country. Radiation oncology institutions provide cancer care and treatment to patients irrespective of the conditions altered by external factors, in this case, COVID-19. This purpose, according to Guo *et al.* (2020: 3), is fulfilled by the oncology multidisciplinary team (MDT), particularly radiation therapists who locate the cancer, plan the treatment, treat the patient and manage the radiotherapy department in order to ensure effective radiotherapy service delivery. During the onset of COVID-19, this clinical service delivery goal was significantly impacted and radiation therapists were faced with challenges in fulfilling their lines of duty.

The ongoing COVID-19 pandemic hindered the obligation of radiotherapy service delivery in many areas of the world, but the study at hand focused on those of South Africa. An explanation by Desta *et al.* (2021: 1) highlighted that the pandemic has caused significant disruption in all-round health service delivery. A previous study indicated that this changed the healthcare setting and increased the responsibilities relating to patient care by healthcare professionals (Chersich *et al*. 2020: 3), and ultimately resulted in increased levels of stress, compromised general well-being, and changes in

clinical service delivery amongst radiation therapists (Shanahan and Akudjedu 2021: 111). In radiotherapy, it is imperative to continue radiation treatment for patients who are and intended to be on regime. In order to fulfil this, it is important that support is provided to radiotherapy radiographers in order to ensure that they continue delivering this essential radiotherapy service. According to Desta *et. al* (2021: 2), the failure to provide support and protect radiation therapists will result in a more compromised radiotherapy service delivery, especially in developing countries where the radiation therapists are limited.

1.6 STRUCTURE OF THE DISSERTATION

This dissertation is presented in six chapters as outlined in Table 1.1 below.

Table 1.1: Structure of Dissertation

Chapter	Description	Content
Chapter 1	Overview of the study	This is the introductory section that covered the analytical abilities of the researcher. It also illustrated the key element of the research, research problem, aims and objectives, and summated the chapters that follow.
Chapter 2	Literature review	In this section, the researcher provides a detailed review of the academic literature such as the description, summary and critical evaluation used in relation to the research problem being investigated. It also selects the theoretical and conceptual framework that guides the study.
Chapter 3	Research design and methodology	The purpose of this chapter is to design the methodology of the research approach through qualitative, quantitative and mixed research techniques.
Chapter 4	Presentation of findings	A presentation of findings from the interview data is proffered in this chapter, including the principal outcomes of the research project.
Chapter 5	Discussion of findings	This chapter provides discussions of the research findings.
Chapter 6	Conclusion, limitation and recommendations of the study.	A presentation of the summary of findings, limitations of the study, conclusion and recommendations arising from the study is made in this final chapter.

1.7 SUMMARY OF THE CHAPTER

This chapter discussed the background to the study, which covered clinical service delivery issues in developing countries such as South Africa. These were mainly presented under the pandemic conditions and they include limited resources, lack of precautionary measures, staff wellbeing and safety, as well as workforce planning. The aims and objectives were clearly outlined and focused on the effects of COVID-19 on radiation oncology centres in developing countries and their respective healthcare workers' experiences during this time of distress. The latter part of the chapter summates the detailed overview of the content of each chapter. Following this current chapter, is a literature review, showing the gap in identifying and understanding the subjective clinical service delivery experiences of radiation therapists in a developing country, and ultimately recommending strategies to support these healthcare professionals in delivering ongoing cancer care.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

A literature review is outlined by Labaree (2009: np) as a piece of academic writing that critically evaluates academic material in order to demonstrate knowledge and understanding of the topic placed in context. Thus, in this section of the paper, the literature review is written to evaluate data collected on radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in the KwaZulu-Natal (KZN) province. To foster an understanding on these disruptions, this chapter discusses seven study facets, namely: (i) Radiotherapy as a profession; (ii) Radiotherapy service delivery; (iii) the Global context; (iv) the Effect and response of African radiotherapy centres to COVID-19; (v) COVID-19 in South Africa as a developing country; (vi) the Introduction of safety regulations and restrictions; and (vii) The theory that guides the study.

2.2 RADIOTHERAPY AS A PROFESSION

Radiotherapy is a therapeutic service used for the treatment of cancer with the intent to cure, alleviate cancer symptoms, or to prevent cancer spread to an organ of spread (Baskar *et al.* 2012: 195), and to ultimately improve the patients' quality of life. The Australian Society of Medical Imaging and Radiation Therapy (2018: 1) expounded that radiation therapy is a fundamental part of radiation oncology, comprising a multidisciplinary team (MDT) with an oncologist, oncology nurse, medical physicists and radiation therapists working together to provide therapeutic cancer treatment. Within this team, radiation therapists are described as healthcare professionals involved in delivering the radiotherapy service prescribed in the treatment of cancer. In conjunction with radiation oncologists, they work collectively to provide this cancer care by locating the cancer, planning the treatment, treating the patient, and managing the radiotherapy department to ensure effective radiotherapy service delivery (Merchant, O'Connor and Halkett

2017: np). Consequently, within the radiotherapy department, radiation therapists are placed at various work stations, namely: leadership, simulation, planning, and treatment machines. In these stations, radiation therapists use innovative computer systems and refined imaging equipment to generate a treatment plan that will be used to deliver the highest possible dose to the tumour, whilst minimising dose to the healthy tissue and organs at risk. This planned treatment delivery also has to be completed with high precision and accuracy utilising highly refined computer-controlled equipment. To ensure this accurate and optimal treatment, radiation therapists' duties in each station are described by (Rebelo *et al.* 2022: np) as follows:

- **Simulator/Computed Tomography (CT) scan:** In this unit, radiation therapists use imaging systems to map-out the target volume from which radiation treatment will be planned and treated. A contrast agent is sometimes injected into the patient to improve the quality of the scan and identify the tumour as well as the critical organs.
- **Treatment planning:** Radiation therapists in this station place computed beams onto the imaging scan to target high dose to the tumour volume and minimizing dose to surrounding healthy tissue.
- **Treatment units:** Involves the operation of high energy machines that deliver external treatment to alleviate cancer symptoms or for curative purposes.
- **Supervisory position:** This included radiation therapists that are in managerial positions, such as assistant directors.

Radiation treatment is completely painless and highly effective. During the course of radiation treatment, cancer patients travel to the department for a period of several days or several weeks and most patients often do not require hospitalization, only travelling to hospitals (Ambroggi *et al.* 2015: 1380). However, some patients might require hospitalization to care for them from cancer spread, breathing difficulties, severe bleeding, and other cancer-related complications.

2.3 RADIOTHERAPY SERVICE DELIVERY

Radiotherapy is outlined by Washington and Leaver (2015: 1) as the medical specialty that utilises ionizing radiation to treat both malignant and some benign illneses, with the objective of delivering the maximum permissible radiation dose required to kill the tumour whilst minimising dose to the critical organs and adjacent tissue. Radiotherapy is an essential service in the oncology community for both palliative and radical cancer management. Rosenblatt (2014: 315) supported that the radiotherapy services are aimed to delivery adequate radiation dose for the treatment of all patients within a culture of safety awareness. The optimum benefit of radiotherapy services ensues when they are incorporated into effective healthcare systems and efficient nationwide cancer control plans. The process of radiotherapy service comprises the following steps:

2.3.1 Computed Tomography (CT) scan

Typically, a computed tomography (CT) scan is used to obtain detailed internal images of the area of the body of interest (Davis, Palmer and Nisbet 2017: 1). To assist in the process of obtaining a CT scan, Naidoo and Leech (2020: 40) explained that radiation therapists measure the anatomical landmarks and mark on the patient's skin where radiation will be received. These are called permanent tattoos. In doing this, the radiation therapists are in contact with the patients to position and immobilize them.

2.3.2 Treatment planning

According to Gardener, Kim and Chetty (2019: 947), the treatment planning process generates a radiotherapy treatment plan aimed at delivering the maximum prescribed therapeutic dose of radiation to the tumour whilst sparing nearby normal tissue. In order to create treatment beams, the images obtained from the CT scan are used to outline volumes of interest such as organs at risk (OARs) or tumour volumes. Radiation therapists follow a protocol to design a radiation treatment plan (Rathod *et al.* 2012: 28).

2.3.3 The impact of COVID-19 on daily treatment

Radiation is a medical therapy used either in conjunction with surgery and chemotherapy, or individually. As explained by Wahl *et al.* (2021: np), the radiation treatment is delivered in multiple forms, including external beam therapy, brachytherapy and radiopharmaceutical therapy. Rehman *et al.* (2022: 2) asserted that optimal treatment delivery requires consistent daily efforts to minimize deviation from the prescribed treatment plan, which is achieved by ensuring daily precision in patient positioning and beam direction. During treatment delivery, high energy radiation is used to treat cancer cells. This is delivered by linear accelerators (LINAC) for external treatment, or through radioactive sources in a brachytherapy instance. Each session is about 15 minutes long and entails verification to ensure that the correct area is treated, then the treatment is delivered.

Shereen *et al.* (2020: 91) defined the Coronavirus-19 disease (COVID-19) as a highly transmittable and pathogenic viral infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Lone and Ahmad (2020: 1300) further mentioned that the virus was first reported from Wuhan city in China in December, 2019. Which, in less than three months, had spread throughout the globe and was then declared a global pandemic by the World Health Organization (WHO). Upon its emergence, COVID-19 created a dramatic shift in hospital settings, putting healthcare workers in distress and anxiety-fuelled working conditions. Of these disruptions, multiple departments in the hospital setting were affected, one of which is the radiotherapy department.

Although numerous studies have been conducted to better understand and explore the impact thereof on radiation therapists' clinical service delivery from the onset of the COVID-19 pandemic, not much research has been done in the developing countries. Therefore, driving the two-fold purpose of this study is the aim: to explore and understand radiation therapists' experiences of disruptions in radiotherapy service delivery exclusively in developing countries where there is resource constraint; and to discover strategies to

support radiation therapists to continue providing optimal radiotherapy service delivery during the ongoing COVID-19 pandemic. The changes due to COVID-19 are not well understood in the various work stations. Thus, this study is intended to also provide information in this regard.

2.4 GLOBAL CONTEXT

The outset of COVID-19 has undoubtedly resulted in a major global shift from normality. Gospodarowicz (2021: 144) further outlined that regardless of the multifactorial challenges in the health system, cancer care is one of the most challenging health problems globally, affecting both developing and developed countries. Within these already known challenges, the onset of COVID-19 further burdened the healthcare sector globally and increased the responsibilities of healthcare professionals relating to patient care (Chersich *et al*. 2020: 3), ultimately resulting in increased levels of stress, compromised general well-being, and changes in clinical service delivery amongst radiation therapists (Shanahan and Akudjedu 2021: 111). Moreover, Dramowski *et al*. (2020: 1) added that previous data showed that part of this impact was high infection, morbidity and mortality, as well as distress and anxiety amongst these healthcare workers.

The aforementioned magnitudes of the COVID-19 pandemic were a matter of concern as it spreads throughout the globe, and both developed and developing countries saw deep and broad clinical consequences. Of the countries affected, Spencer *et al.* (2021: 309) revealed that during the first wave of the pandemic, one of the most severely affected countries was the United Kingdom (UK. In response to these consequential pressures, the same authors stated that professional bodies, commissioners and service providers within the UK and internationally dispensed revised guidelines to care for cancer. Another discussable case was highlighted by Wakefield *et al.* (2020: 357), where the United States (US) was said to have faced challenges in safely caring for high-risk cancer patients, but adapted practices quickly by refining standard processes of care; implementing recommended safety measures; and employing telemedicine to ease the

continuity of treatment. In this case, cancer patients experienced uninterrupted access to care. Many other developed countries followed a similar pattern to adjusting to the phenomenon. However, developing countries slowly implemented safety measures because economic factors restricted them. In South Africa, the clinical and financial impacts of COVID-19 were close to dire and are still evolving with time. According to Kollamparambil and Oyenubi (2021: 2), the country saw multiple levels of lockdown where the intention was to contain the virus and develop uniform responses to the pandemic. However, with a country as economically and socially divided as South Africa, this socio-economic goal was an unrealistic expectation, thus leading to multiple impacts within the health and social fields.

2.4.1 Disruptions of COVID-19 in hospital settings

Hospitals comprise numerous and various departments that aid in the treatment of specific disorders and deliver optimal patient care. In Oncology, radiotherapy is one the departments whose tasks are goal-oriented, diversely inclusive, orderly and encourage teamwork as well as clinical independence. According to Wei *et al*. (2020: 204), the fast-paced infection of COVID-19 put radiation therapists at an increased risk of contracting the disease. Occupational characteristics, such as interfacing with possibly infectious patients and being in close quarters with fellow colleagues, not only put them at high risk of the disease, but also created a nexus of disease transmission to the community (Baker, Peckham and Seixas 2020: 5). This enforced changes within the oncology setting, from patient admission, to patient care, and standards protocols, right down to the environmental mood as tension and anxiety was on the rise.

In radiation oncology, curative treatment plans for patients revolve around surgery, systematic cancer therapy, and radiotherapy, but during the pandemic, there were disruptions to the provision of these services. Spencer *et al.* (2021: 309) gave supporting details that constraints on COVID-19 testing and staff shortages impacted the three modalities of treatment. The

same authors maintained that oncology surgery faced a lot of pressure due to the adaptation of theatre space being shared for the care of acutely unwell COVID-19 patients in need of ventilation. Italy also saw serious repercussions of the pandemic in one of its national hospital systems, where Caravatta *et al.* (2020: 3) explained that although witnessing more contained infection case numbers, the Italian hospital (the University Hospital at Chiete) re-organised to conform to COVID-19 measures over a short period of time, and this situation carried a double risk due to potential delays or interruptions to oncology therapies such as radiation therapy. This meant that the intention of the radiation treatment to save patients' lives was outweighed by the risk of possible infection to the already frail patients with low immune systems.

In South Africa, many hospitals went through the same ethical situation. South African hospitals followed through and triaged oncology procedures such as chemotherapy, surgery and radiation. Pride and Barney (2020: 753) supported that many clinicians were concerned about abounding evidence-based radiotherapy treatment and therefore continued to classify radiotherapy services as critical cancer services throughout the pandemic. This coalition meant continuing with the treatment of the influx of radiotherapy patients and continuing to exhaust the already limited resources and staff. Consequently, it is important to investigate the personal experiences of these healthcare workers as their wellbeing was of less consideration during the pandemic.

2.4.2 Disruptions of COVID-19 for healthcare professionals

As a result of the pandemic, there was a rapid spread and increasing challenges for healthcare professionals globally. Multiple departments and their staff were affected by this phenomenon, one of which was the Radiation Oncology department. In radiation oncology, a team of healthcare professionals, referred to as an MDT, runs the department.

Taberna *et al.* (2020: 1) defined a radiotherapy MDT as the cooperation between various expert professionals involved in the care of cancer, with the overarching goal of improving treatment efficiency and patient care, and its core goal is further corroborated by Zhao, Qi and Chen (2020: 4) as an improvement of the staging accuracy, treatment selection and successful treatment delivery to improve outcomes. These joint-effort professionals in radiation oncology include radiation oncologists, medical physicists, oncology nurses, and radiation therapists. Apart from the team existing in co-dependency in a department, radiation therapists play their own important role of clinical service delivery, mainly producing quality treatment plans for patients and executing them.

During COVID-19, oncology professionals such as radiation therapists globally experienced increased responsibilities relating to patient care (Chersich *et al*. 2020: 3), which subsequently resulted in increased levels of stress, compromised general wellbeing, and changes in clinical service delivery (Shanahan and Akudjedu 2021: 111). In terms of clinical effects, Alnazly *et al.* (2021: 22) echoed that the pandemic psychologically and mentally affected these healthcare workers, while seeing a rise in the demands of clinical care, increased emotional and physical stress, patient mortality, as well as rationing of healthcare supplies. Notably, these factors overwhelmed the healthcare workers in discussion, with a perceived inadequate organizational support from the hospitals. An explanation by Desta *et al.* (2021: 1) is evidence that indicated that the COVID-19 pandemic had brought significant disruptions in health service delivery, especially in developing countries.

In developing countries such as South Africa, India and others, Neill *et al.* (2021: 1) explained that as a result of the pandemic, there were disruptions of clinical service delivery that created an enormous amount of financial, administrative and logistical stress as these low income-countries tried to catch up to other countries' supportive interventions. Subsequently, this spiked an increased interest in global health actors to shift to a people-centred integrated health service delivery (IHSD) approach aimed at

pandemic preparedness, response and recovery (Neill *et al.* 2021: 2). According to Alnazly (2021: 3), previous studies revealed that the effects of infectious diseases such as the virus under discussion often have psychological effects that can last long after the event, negatively affecting general wellbeing and causing post-traumatic stress disorder, depression, and burnout amongst healthcare workers. Thus, the aftermath of the unprecedented pandemic and medical crisis exposed healthcare workers such as radiation therapists to a variety of mental health burdens.

2.4.3 Disruptions in working conditions during the COVID-19 pandemic

According to Malicki *et al.* (2020: 821), radiotherapy is known for its key patient-facing health professionals who play a vital role in the delivery of optimal patient care in oncology. With the emergence of the COVID-19 pandemic, Wei *et al.* (2020: 206) reported that the field had to make a shift in order to adjust to the new "norm". For radiation therapists, this meant employing new and improved clinical working patterns to reduce the risk of infection. These new working patterns were adopted from international countries and entailed phased lockdown regulations aimed at guaranteed work continuity (Caravatta *et al.* 2020: 3).

Shanahan and Akudjedu (2021: 112) expounded that radiation therapists have an important role in investigation and management pathways. Moreover, the use of therapeutic mobile equipment is prominent in fulfilling this role and the same equipment had to be spread across patients, increasing cross-contamination. Hasford, Ige, and Trauernich (2020: 1392) added that to reduce the concern and risk of cross-contamination during this era, strict preventive and containment measures were put in place to ensure that health services are continually delivered without compromising the safety of patients and radiation therapists as they continued to work in close proximity. Thus, the practice of frequent disinfection of the immobilization devices and equipment used in radiotherapy was paramount.

Tracer studies addressing the experiences of this menace amongst radiation therapists and the disruptions they encountered in their clinical service delivery were mostly explored its effect in relation to developed countries. Hence in this study, the researcher aims to provide a comprehensive update on the radiotherapy service delivery experiences of radiation therapists during the onset and ongoing COVID-19 pandemic in KZN, South Africa. In so doing, clinical service delivery will be improved while recommendations are made to give continuous staff support to radiation therapists as the pandemic era continues.

2.4.4 Clinical challenges during the COVID-19 transitional phase

A study by Wakefield *et al*. (2020: 357) in the United States (US) showed proof that when the pandemic hit, oncology practices faced challenges with safely caring for the high-risk population with minimal evidence to guide them. Although facing this challenge, all practices reported the continuation of radiation therapy services, and as a result, the majority of these practices experienced a significant change to the regular clinical workflow. These include:

- ***Unstable patient volume:*** Most to all practices experienced declines in patient volumes, mostly due to reduced referrals and treatment delays as the new patients coming in carried a higher risk of infection than those already on treatment. This also helped control the number of patients in a radiotherapy center.
- ***Personal protective equipment (PPE) shortages:*** Wakefield *et al.* (2020: 358) continued to state that most centers experienced some form of shortages in PPE and other infection control supplies. Of these supplies, face masks, gowns, gloves, hand sanitizers, and even testing equipment such as COVID swabs became scarcer with the prominence of the viral spread.
- ***Staff reductions:*** Due to more staff or their family members testing positive for the virus and the need for them to quarantine, most centers experienced staff shortages during the pandemic.

- ***Increased patient backlog:*** Although chemotherapy, surgery and immunotherapy are considered outstanding modalities in the treatment of cancer patients, Pride and Barney (2020: 752) posit that radiotherapy became the go-to treatment modality. The aim was to mitigate the risk of these cancer patients acquiring a respiratory disease and deteriorating into a worse health state, but ultimately increased the number of patients treated during this time.

Radiotherapy clinical activity fell significantly during the onset of COVID-19. Other countries such as the UK were said to have, at the outset of the pandemic, all three treatment radiotherapy modalities (surgery, systematic treatment and radiotherapy) being affected by constraints of COVID-19 testing and staff shortages.

2.5 THE EFFECT AND RESPONSE OF AFRICAN RADIOTHERAPY CENTRES TO COVID-19.

In Africa, radiotherapy has been an integral section of cancer control programs. While this is so, Reuter-Oppermann *et al.* (2020: np) explained that the African healthcare system has always been facing deficiencies and the COVID-19 effect thereupon was anticipated to be catastrophic. This was seen to be true when Egypt was the first country to report a COVID-19 case. As the virus continued to spread throughout Africa and globally, (Kochbati *et al.* 2020: np) added that in Africa, the oncology communal had to safeguard its risk patients and caregivers whilst ensuring that the necessary clinical services are continuing. The guidelines for managing cancer came during the pandemic, which included the introduction of hygienic practices such as regular washing and sanitizing of hands and surfaces, as well as lockdown regulations in every state (Hasford, Ige and Trauernich 2020: 1392). Lockdown regulations were implementations intended to control the spread of COVID-19.

In radiotherapy centres, the lockdown introduced a system of confining patients on treatment to the hospital and limiting patient escorts from entering

treatment units or premises either for visits or accompanying patients. Haider *et al.* (2020: 3) explained that in the clinical setting, a vigorous concern for experts in public health was assisting policy-makers adopt the key goals of alleviation, such as reducing mortality rate and related disease; or maintaining the effects on the economy within controllable levels; or levelling the epidemic curve, or avoiding an epidemic ultimate that engulfs healthcare services. Thus, the choice lay between allowing herd immunity to develop and accepting spread and accepting spread, and accepting a certain loss or attempting suppression by way of vaccinations.

In the general regulation and response from the continent, when it came to home confinement, Uganda and South Africa employed the firmest measures. A countrywide curfew in South Africa commenced in 2020 at the end of March and encompassed the ban of any exercise outside the home, which permitted only the necessary activities between 08:00 and 15:00 hours (Haider *et al.* 2020: 6). Nigeria and Sudan soon followed with similar confinement regulations. Haider *et al.* (2020: 7) further explained that the experience of lockdown is moulded by factors such as the capacity of pre-existing social welfare services and levels of poverty and financial insecurity; the degree of social solidarity in society (which influences how people experience lockdown measures psychologically and emotionally); pre-existing; levels of fear about the virus; structure of the economy; public trust in government; and the disposition of specific alleviation measures. Even though the economy was affected by the pandemic, by virtue of global progression with regard to responding to COVID-19, African countries managed to catch up with their counterpart countries' healthcare status. This proved South Africa to have somewhat resilience to coping with such catastrophic events, even though they lack infrastructure and funding.

2.6 COVID-19 IN SOUTH AFRICA

South Africa comprises nine provinces: Western Cape, Eastern Cape, Northern Cape, North West, Free State, Gauteng, Limpopo, KwaZulu- Natal, and Mpumalanga. In terms of geographical size, the smallest and largest

provinces are Gauteng and Northern Cape, respectively. However, the former is mostly populated than the latter (Moonasar *et al.* (2021: 2). The same author maintained that South Africa is categorized as an upper middle-income country. Levin *et al.* (2022: 1) defined “upper middle-income countries” as a similar term to developing countries, and describes nations that have low living standards, an undeveloped industrial base, and low Human Development Index (HDI). Posel, Casale, and Grapsa (2020: 112) further explained that South Africa is an example of a developing country as it has a substantial variation in household size, and composition by income class and by race is low, and ultimately it has poor health services. In fact, with regard to its healthcare, the healthcare system in South African is two tiered, consisting of private and public, government-run sectors. In the latter sector, the services are classified into tertiary (academic), secondary (district and regional hospitals) and primary (clinics). The National Department of Health is accountable for the development of health associated guidelines and policies, which are then implemented at district and provincial and levels (Moonasar *et al*. 2021: 2).

In South Africa, service delivery is a buzzword epitomized in the Batho Pele principle, which means “People first”. The Batho Pele principle, according to Mboweni (2022: 1), was put in place to enhance and simplify the relationship between public servants and the population, thus facilitating service delivery. This meant that oncology care, along with other health departments, had to assume the responsibility of continuing patient care and optimal service delivery during the pandemic. To fulfil this purpose, Shanahan and Akudjedu (2021: 111) state that the government was called in to ensure that inadequate resources such as PPE, disposable gloves, and surgical masks were made available. However, this still put strain on already limited staff, such as radiation therapists.

2.7 THE INTRODUCTION OF SAFETY REGULATIONS AND RESTRICTIONS

As of the initial detection of the COVID-19 infection, countries throughout the globe started implementing strategies to contain the spread in order to draw focus back onto other illnesses. An opinion by Thomas *et al.* (2020: np) highlighted that all healthcare systems were susceptible and countries could take practical steps to increase the available resources and ascertain the capacity to mobilize, adapt and use those resources in different shock scenarios. Alnazly *et al.* (2022: 2) mentioned that the commendations involved in the designation of numerous hospitals as treatment centres for potential patients with COVID-19, and recognized protocols to combat the spread of the country's communicable diseases, before reporting the first case of COVID-19. The Jordan Ministry of Health shadowed the recommendations of the epidemic committee and opened five hospitals found in various areas within the country selected to treat patients infected with COVID-19 virus. Those hospitals were provided with PPE such as gowns, masks, and face shields, ventilators, and infectious disease trained medical staff and were also implemented with quarantine policies. Countries worldwide started adapting to similar regulations, including the closing of borders, suspension of schools, and banning of public gatherings.

In South Africa, the cluster of cases that were gradually reported around the country created concern and the country then introduced measures to contain the spread. Moonasar *et al*. (2021: 1) explained that in preparation for an anticipated local spread of COVID-19, the South African Ministry of Health established its incident management team that was modelled on the WHO's Framework for a Public Health Emergency Operations Centre. From this, safety measures against COVID-19 were suggested and implemented. These include practices such as frequent washing of hands with soap under running water; regular cleaning of hands with sanitizers; observing social or physical distancing; avoiding large gatherings, as well as self-isolating. In radiotherapy centres where cancer patients are treated with high doses of radiation, Hasford, Ige, and Trauernich (2020: 1392) mention that these safety measures were observed in combination with radiation safety

practices in order to ensure the overall safety of the patients, caregivers and staff.

2.8 THEORY THAT GUIDES THE STUDY

In qualitative research, a theory offers direction to comprehend the methods that will assist to respond to the research questions (Collins and Stockton 2018: 1). The same authors explained the two core categories of theories employed in qualitative studies, namely conceptual and theoretical frameworks. A conceptual framework is explained as a map of how all of the literature is gathered in an individual study. In a theoretical framework, a theory is utilized in a study to express the rationale of why the research problem occurs and clearly pronounces how the research study will develop the new information. A theoretical framework connects the present information and earlier made thoughts about compound phenomena, the researcher's epistemological outlooks, and a lens and a methodically analytic approach (Collins and Stockton 2018: 1). Seeing that theory-free research does not exist, this study will be guided by Kurt Lewin's Change theory (Kaminski 2011: 1) and the conceptual framework based on the literature review of previous studies pertaining to the impact of COVID-19 on hospital settings, healthcare professionals and working conditions (Wei *et al*. 2020: 204; Chersich *et al*. 2020: 3; Malicki *et al.* 2020: 821). This theory refines the change in an organization, the change implementation process; how employees are involved in change and their willingness to change; and how leadership affects the organizational change process (Hussain *et al.* 2018: 123). Using this theory and the concepts in the literature review of previous studies will assist the researcher to understand and describe the ongoing COVID-19 disruptions in the delivery of radiotherapy service as experienced by the radiotherapists. Moreover, the researcher will discover how leadership can provide support to the radiation therapists in order to continue providing essential radiotherapy service delivery despite the challenges as a result of ongoing COVID-19. The visual representation of the relationship between these variables is depicted in the diagram below.

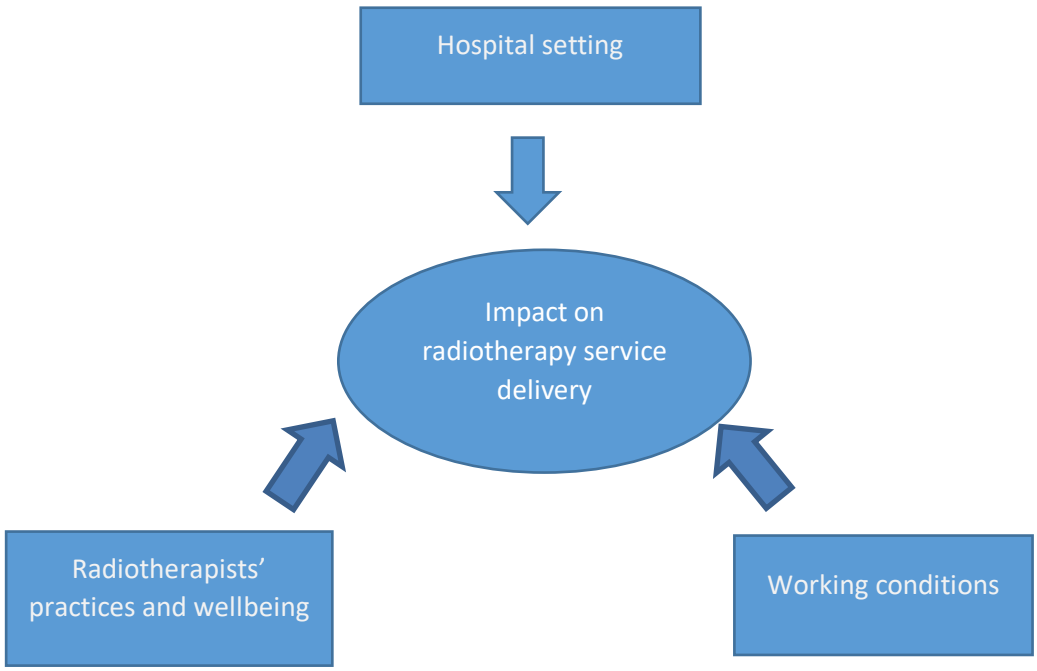

Figure 2.1: Conceptual framework of factors impacting on Radiotherapy service delivery during COVID-19

2.9 SUMMARY OF THE STUDY

In this section of the study, a literature review is presented to build up on the exposure of disruptions that the COVID-19 pandemic brought to healthcare systems, more specifically in the radiation therapy field. Radiation therapists in South Africa, as a developing country, lacked proper guidance to continue safe clinical practice during the pandemic. Although numerous studies have been conducted to identify and comprehend the factors contributing to the disruptions of clinical service delivery in the radiotherapy profession, there is no unanimous literature regarding interventions to enhance future pandemic preparedness in South Africa. Very few to no research studies have been found to address the health inequalities in the national radiotherapy practice to ensure continuous radiotherapy service delivery and support radiation therapists and their wellbeing post the pandemic. The next chapter describes the research methodology employed to guide the study.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

The purpose of this chapter is to set out the design of the research study and the methodology followed in data collection. To fulfil this purpose, the chapter explains the research paradigm in relation to the study context and, the data collection methods. The analysis techniques are also described, as well as the setting where the study was conducted. It further discusses the sampling process, as well as the inclusion and exclusion criteria for the sample. The chapter concludes with a discussion on the ethical considerations of the research and the outcome of the research.

3.2 RESEARCH PARADIGM

In research, a paradigm is defined as a scientific set of beliefs or assumptions that guide a research study (Park, Konge, and Artino 2020: 690). These assumptions are said to be related to the nature of reality, the relationship of the researcher to that being researched, the role of value in the study, and the process of research (Creswell and Plano Clark 2017: 46). Kivunja and Kuyini (2017: 26-27) outlined three essential elements of a research paradigm, namely- ontology, epistemology and methodology. The researcher in this study adopted a constructivist paradigm. According to Kivunja and Kuyini (2017: 33), in order to understand the constructivist paradigm, it is worthy to note that reality is socially constructed. In application to the current study, this approach alludes to an effort to ‘get into the head of the participant being studied’, and to understand the meaning a participant is making of the context. In addition, the next section briefly describes the three aforementioned components of a research paradigm (ontology, epistemology and methodology).

3.2.1 Ontology

Andrew (2016: 1) explained that ontology in a qualitative study refers to the study of being, and views the social world as complex. The ontological aim

of research in this context was to uncover the reality of things as they exist. Subsequently, the reality in this study gravitated towards the emergence of COVID-19 and the impact thereof on radiation therapists who were required to continue with the delivery of the radiotherapy clinical service delivery during the pandemic.

3.2.2 Epistemology

In simple terms, epistemology is defined by Brown (2022: para 1 lines 4-6) as the theory of knowledge, and deals with how this knowledge is gathered as well as from which sources. This means that the researcher's view of the world and of knowledge strongly influences data interpretation. Al-Ababneh (2020: 77) states that this element, epistemology, is inherent in the theoretical perspective as a way of looking at the world and making sense of it. The application of a subjectivist epistemology in context of this study, on radiation therapists who have experienced COVID-19 disruptions can provide information on how the COVID-19 phenomenon affected the radiotherapy service delivery. The researcher used interviews to collect this information.

3.2.3 Methodology

This element is described by Al-Ababneh (2020: 77) as the strategy, plan of action, process or design lying behind the choice and use of particular methods, and linking the choice and use of methods to the desired outcomes. Major types of methodology are: experimental research, survey research, ethnography, phenomenological research, as well as the Grounded Theory. Methodology is further linked to the research design, approaches, methods and procedures used in an investigation (Kivunja and Kuyini 2017: 28). To gather information about the radiotherapy service delivery, the researcher collected information in audio and written form, and used the appropriate research design, approach, methods and procedures to create a "blueprint" of this research project.

3.3 RESEARCH DESIGN AND APPROACH

The research design is a crucial part of any study as it is concerned with turning research questions into projects. The research design decides on the strategy one chooses to put all the different components of the study together in a logical way, thereby, ensuring that it will effectively address the research problem (Trochim 2020: para. 1 lines 1-3). Al-Ababneh (2020: 87) emphasized that the choice of research design depends on the purpose of the research conducted, hence the option of four main types of research design, namely: an exploratory study, descriptive study, explanatory study, and emancipatory study. Moreover, Jongbo (2014: 91) stated that a good research design must fulfil the ultimate rationale of translating research problems into data for analysis in order to provide answers to research questions validly and objectively.

The current study was conducted qualitatively, employing an exploratory design. According to Qutoshi (2018: 215), this is a phenomenological approach that allows the researcher to understand the meaning of the subjects' lived experience. An exploratory study is characterized by the same author as a flexible design that focuses on investigating what is happening, asking questions, seeking new insights, assessing phenomena in a new light, as well generating ideas and a hypothesis for future researches. In application to this study, this chosen design facilitated the understanding of radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KZN, South Africa. The rationale for this stemmed from a lack of studies conducted in developing countries such as South Africa.

3.4 STUDY SETTING

Snowdon *et al.* (2018: 39) provided a brief description of the study setting as being a place where the data is collected. Qualitative researchers conduct studies in their natural setting, attempting to make sense of or interpret phenomena in terms of the meanings that people bring to them (Creswell and

Creswell 2017: 15). This involves going out to the people or field of study, gaining access, and gathering information (Creswell and Creswell 2017: 17).

For this study, data was collected in the natural setting where radiation therapists work and are familiar with the environment. This setting was in two public oncology hospitals in KwaZulu-Natal (KZN). KwaZulu-Natal is described by Motlana *et al.* (2021: 2) as the second most populous province in South Africa with an estimated population of 11.3 million. It is organised into 11 districts with one metropolitan municipality and 10 district municipalities (Figure 3.1 below). According to Motlana *et al.* (2021: 2), the province has 77 public hospitals and only three of those offering radiotherapy services across all 11 districts. For this study setting, the radiotherapy department has various stations such as leadership, simulation, treatment planning, treatment execution where the radiographers are placed at each station. There is one (1) manager in the leadership, are two (2) radiation therapists each placed at the simulation and treatment planning sections. There are 8-12 radiographers placed at the treatment execution section. The interview environment had to be private and noiseless in order to avoid interruptions and allow for a two-way communication flow between the interviewer and its participants. During the time of the interviews, the environment had to allow the participants the natural state of comfortability and freedom of expression, meaning that they had to feel relaxed and safe enough to express their genuine opinions freely. To avoid disruption, interviews were conducted in a quiet place and at a convenient time for the participants.

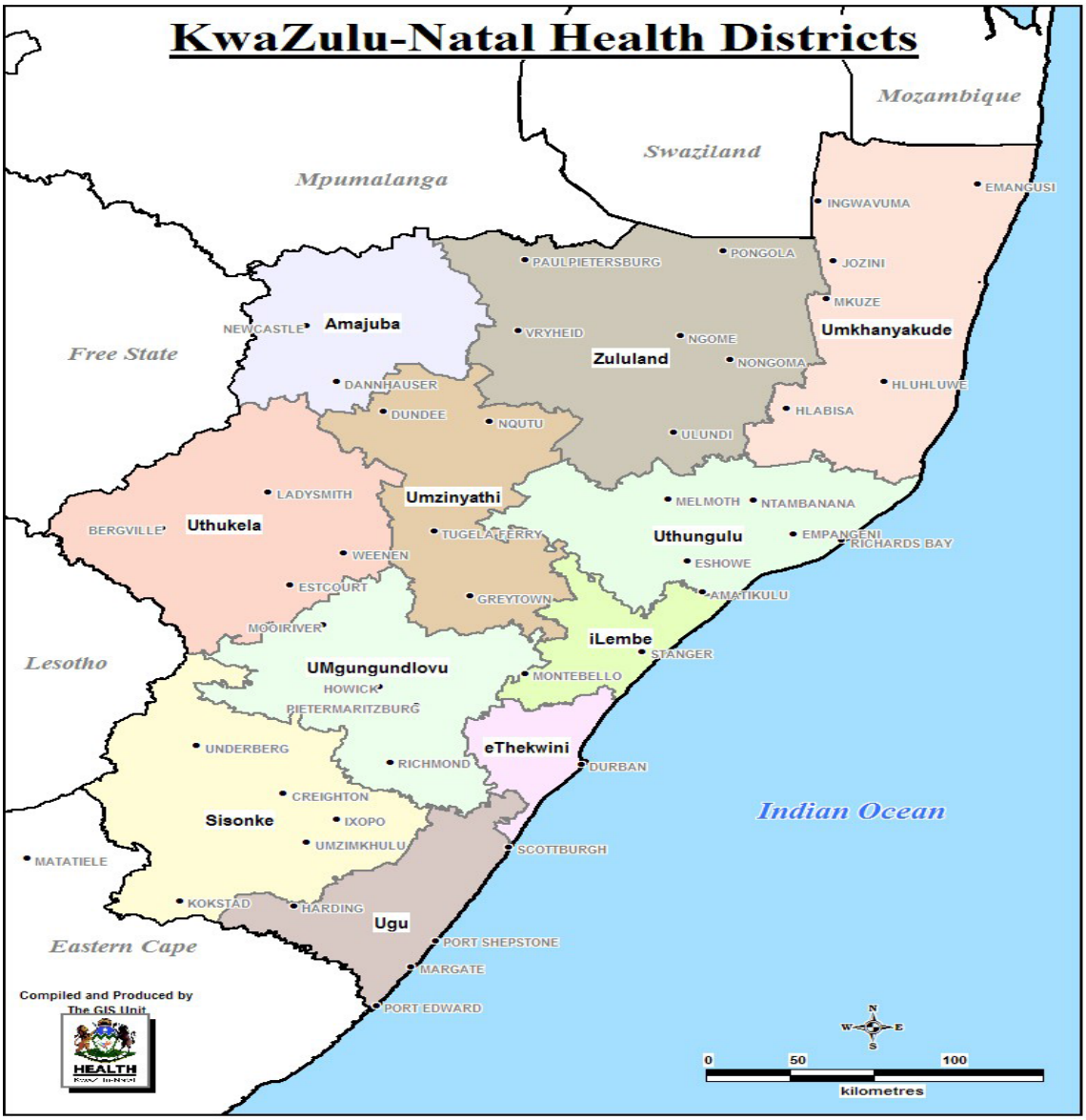

Figure 3.2: The map showing health districts in KZN

Source: KwaZulu-Natal Department of Health 2007

3.5 SAMPLING PROCESS

Leavy (2017: 76) described sampling in research as a technique where a set of respondents is chosen from a larger population to participate in the study. A study by Nyimbili and Nyimbili (2024: 90) verifying the purposive sampling tool developed by Patton (1990) described the sampling tool as one used in most research papers in order to ensure that quality sample is located without biases so as to increase the reliability and trustworthiness of the findings. Further to that, Campbell *et al.* (2020: np), added that in a qualitative study the purposive sampling is utilised to match the sample to the study's aims and objectives, thus enhancing the quality of the study and trustworthiness of the data and findings, as with the current study. Four aspects to this concept have previously been described: credibility, transferability, dependability and confirmability.

To adhere to the aforementioned aspects, criterion purposive sampling was used to select three public oncology hospitals. From each, the critical case sampling selected a radiotherapy manager as well as simulator, planning and treatment machine radiation therapists to constitute a minimum sample size of ten. The maximum sample size was determined by data saturation. According to Austin and Sutton (2014: 438), data saturation occurs when no new information is coming forth to identify new themes. In this study, the researcher was obligated to consider participants as those who met the inclusion and exclusion criteria as follows:

3.5.1 Inclusion criteria

Participants were included in the research study provided they were:

- Qualified radiation therapists employed at KZN public oncology hospitals;
- Radiation therapists with a minimum of one year's work experience; and
- Health Professions Council of South Africa (HPCSA) registered radiation therapists.

3.5.2 Exclusion criteria

Participants were excluded from the study if they were:

- Radiation therapists from private oncology hospitals in KZN;
- Currently on training or radiation therapy students in their clinical rotations; and
- Community service radiation therapists.

3.6 RECRUITMENT PROCESS

A definition by Preston *et al.* (2016: para. 6 line 1-3) describes recruitment as a three-step process that involves initially identifying potential participants against the inclusion and exclusion criteria and approaching or contacting them about the study. For recruitment in this study, an email was sent to the Chief Executive Officers (CEOs) of the two public oncology hospitals requesting to meet with the radiotherapy manager and the staff to provide them with information about the study and request their participation. The researcher requested the radiotherapy managers to meet with them on the day of their staff meeting in order to meet all staff members and inform them about the study. After the meeting, the researcher left contact details for the potential participants to contact the researcher if they were willing to participate in the study.

3.7 DATA COLLECTION TOOL

The data collection tool is an instrument used to collect information from all the relevant sources to find answers to the research problem, test the hypothesis, and evaluate the outcomes (Leavy 2017: 38). Data collection methods in qualitative studies vary from interviews to surveys, ethnographies or even focus groups, and these provide the researcher with deep insights (Barrett and Twycross 2018: 64). In this study, semi-structured face-to-face interviews with open-ended questions were used to collect data using an interview guide (Appendix 4). The interview guide consisted of two sections,

namely demographic information of the participants and interview questions. The questions in the interview were designed to be open-ended, resulting in more in-depth and long answers, requiring more expressive thoughts and opinions from the radiation therapists interviewed. The data collection tool was developed by the researcher and were reviewed at three research committees within the institution.

3.8 DATA COLLECTION PROCESS

In research, the data collection process is a systematic process whereby observations or general information is gathered from subjects (Barrett and Twycross 2018: 63). The same authors further explained that data collected for academic purposes allows the researcher to gain first-hand knowledge and original insights into the research problem. Johnson, Adkins and Chauvin (2020: 140) indicated that researchers need to develop clear and detailed data collection guidelines to ensure that the results obtained will be accurate, reliable and unbiased.

Prior to collecting data, the researcher of the current study obtained ethical approval from the Durban University of Technology (DUT) Institutional Research and Ethics Committee (IREC), with an ethical clearance number IREC 288/22 (Appendix 1). The researcher then sought gatekeeper permission from the KZN Department of Health (Appendix 2a), where approval was granted (Appendix 2b). The Heath districts were then approached through the Health Districts managers of eThekwini (Durban) and uMgungundlovu (Pietermaritzburg) districts (Appendices 3a and 4a respectively), and permission was granted (Appendices 3b and 4b respectively). Permission to gain access to the two public oncology hospitals was sought from the CEOs of the two hospitals (Appendices 5a and 6a respectively) and permission to conduct the study in the hospitals was given by the CEOs (Appendix 5b) in the one hospital and from the other hospital (Appendix 6b). Lastly, the researcher followed a similar approach to obtain permission from the radiotherapy managers of both oncology hospitals

(Appendices 7a and 8a respectively), and permission to conduct the study was granted by the radiotherapy department managers of both hospitals (Appendices 7b and 8b).

Once all requested permission was granted by the gatekeepers, the researcher commenced with the collection of data. During this process, departmental managers received invitation emails to briefly explain the goal of the study and request a meeting with radiation therapists. The researcher asked the radiotherapy managers of both hospitals to meet with them on a day of their staff meeting in order to meet all staff members. After the meeting, the researcher left contact details for the potential participants to contact the researcher if they were willing to participate in the study.

For the interview process to begin, participants were each given a letter of information detailing the study (Appendix 9) and were informed that they would remain anonymous, their information will be private and they could withdraw at any time during the study should they wish to, and they will not be penalized. They were informed that they would not be remunerated for participating in the study. To achieve the assured confidentiality and anonymity, no names or identifying information will be published in the final study, and where necessary, pseudonyms would be used. Upon agreeing to be part of the study, willing participants were each given a consent form (Appendix 10) to sign, granting interview permission and agreeing to the interview conditions. An interview guide (Appendix 11) consisting of two sections, demographic data and interview questions, was used to collect data.

According to McGrath, Palmgren, and Liljedahl (2019 :1003), in medical education, semi-structured interviews are often applied, meaning that the interview guide includes a number of pre-determined questions (typically 6 questions), but the interviewer can probe in order to dig deeper into the interviewees' responses through follow-up questions. This study employed in-depth, semi-structured, face-to-face interviews to collect data. The questions were open-ended to allow participants to speak freely of their lived

experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic in order to gather data that would lead to more structural descriptions as participants spoke.

These interviews were all conducted in English because participants were radiation therapists that were trained in English. The interviews lasted for 30-45 minutes, and were conducted at times and places that were convenient for participants in order to avoid disruptions to their workflow. The researcher conducted the interviews at the respective hospitals within the radiotherapy departments. To avoid disruption, these interviews were conducted at each participants' preferred setting free of distractions. This was also done to attain easy access to the participants and find a room that was free of noise and disruptions. Ten participants were interviewed and their interviews were audio-recorded with their permission.

In broad terms, saturation is used in qualitative research as a criterion for discontinuing data collection and/or analysis. Its origins lie in Grounded Theory, but in one form or another, it now commands acceptance across a range of approaches to qualitative research (Saunders *et al.* 2018: 1894). In qualitative research, the use of probing questions assists in attaining data saturation. An article by Fusch and Ness (2015 :1409) explained that if one has reached the point of no new data, one has also most likely reached the point of no new themes. Therefore, one has reached data saturation. In the current study, data saturation was reached by the 8th participant and the researcher continued to interview two more participants to maintain the intended sample size and ultimately verify data saturation. The interview data were transcribed verbatim before data analysis.

3.9 DATA ANALYSIS

By definition, Austin and Sutton (2014: 438) explained that despite the research method employed, the investigator should attempt to analyse or make sense of the respondents' stories. At a more advanced point, Austin and Sutton (2014: 439) added that data analysis allows the addition of definite measures along with examining for arrangements of relationships

that exist amongst the groups of data. In the current study, the Colaizzi's Seven-step method of data analysis was used to analyse the collected data. Sanders (2013: 294-301) described those steps as follows:

Stage 1: Acquiring a sense of each transcript by reading the participants' storylines or listening to the audio tapes several times to acquire a feeling for their ideas in order to understand them.

Step 2: Extracting significant statements by reading and re-reading the transcripts, and extracting significant phrases and statements in order to identify and highlight the participants' experiences of radiotherapy service delivery during COVID-19.

Step 3: Formulation of meanings by formulating more general re-statements or meanings for each significant statement distilled from the text.

Step 4: Organizing formulated meanings into clusters of themes.

Step 5: Exhaustively describing the investigated phenomenon by integrating all the resulting ideas into an exhaustive description of the phenomenon.

Step 6: Describing the fundamental structure of the phenomenon.

Step 7: Returning to the participants for a further interview in order to elicit views on the essential structure of the phenomenon and ensure that it represents their experience.

To ensure fulfilment of Colaizzi's Seven-step method of data analysis, the researcher familiarized herself with the collected data by listening to the transcripts and ultimately transcribing all the recorded audio, reading through text form, and taking notes to be familiar with the data. Significant statements and phrases were identified to highlight the aim of the research, which was to explore radiation therapists' experiences of disruptions in radiotherapy service delivery and recommend strategies to support radiation therapists to provide ongoing optimal service even post pandemic. Following this, the researcher generated themes that showed a valuable and correct representation of the collected data. The researcher cross-checked by

returning to the collected data to check if the themes generated aligned with the dataset.

The researcher ensured that the collected data was securely stored in a password-protected computer and only the researcher knew the password. Collected data would be stored for five years and after five years, will be deleted.

3.10 TRUSTWORTHINESS

According to Polit and Beck (2012: 267), trustworthiness is derived from data collection to analysis in qualitative research. The authors proposed four criteria that should be considered by qualitative researchers in the quest for a reliable study. By tending to similar issues, Polit and Beck (2012: 268) echoed Lincoln and Guba's constructs relating to the criteria of credibility, transferability, dependability and confirmability.

(a) Credibility

The qualitative investigator's concept of credibility deals with the question: "How congruent are the findings with reality?" Lincoln and Guba contend that guaranteeing credibility is one of the most significant factors in building trustworthiness (Cloutier and Ravasi 2021: 127). The researcher ensured credibility by continuous engagement with each radiation therapist during data collection, enabling participants to recognize their experiences and allowing them to express it as such, without misinterpretation. The researcher further used the same supporting material such as letters of information, consent forms and interview guides for each radiation therapist's interview.

(b) Transferability

Transferability denotes the ability to apply the discoveries in different settings or to different participants. The qualitative researcher in this element is not fundamentally keen on summing up (statistically) the findings, but instead in defining observations within the particular setting in which they occur. Strategies to enhance transferability are thick portrayals, purposive sampling and data saturation (Cloutier and Ravasi 2021: 126). As per the methodology section, criterion non-probability purposive sampling was employed to select

a variety of participants from the chosen setting. This ensured representation of radiation therapists from the CT/simulator, treatment planning and treatment machine. The selection of the participants was strictly based on their individual experiences, their qualified roles, and their relation to the disruptions during COVID-19.

(c) Dependability

Dependability is a further foundation listed by Cutler, Halcomb and Sim (2022: 127) to set up the trustworthiness of the study. This requires a review. The inquiry auditor (generally a peer) peruses the process and procedure used by the researcher in the study and decides if they are eligible (Cloutier and Ravasi 2021: 126). This study was then compiled from previous existing literature that covers the impacts of COVID-19 on radiation therapy as a service delivery discipline in both developing and developed countries. A final detailed draft with summated findings was submitted for required ethics approval.

(d) Confirmability

Confirmability ensures that the findings, conclusions and suggestions are supported by the data, and that there is an internal understanding between the investigator's interpretation and the actual evidence. This is likewise accomplished by incorporating a review method (Cloutier and Ravasi 2021: 124). In this study, data collection and interpretation have been obtained from interviewing different participants. These interviews were audio recorded with the participants' permission and later thoroughly transcribed. The researcher's interpretation of the data was then scrutinized by the supervisor, who then acts as an independent coder. The researcher further recorded issues that arose and were encountered while analysing the data and presented it to their supervisor for weekly discussions. This resulted in thorough reflection and feedback in the final completion of data collection.

To avoid bias, the framed interview questions were open-ended, and the researcher guided the participants to provide truthful and honest answers. General questions were asked first, before moving to specific or sensitive

questions. The researcher avoided leading questions that can prompt the participant to respond in favour of a particular assumption. In some instances, the questions were asked in different ways like asking what a third person would do in a particular situation. All the collected data were analysed with a clear and unbiased mind. The researcher also ensured that pre-existing assumptions were kept at bay.

3.11 ETHICAL CONSIDERATIONS

Ethics implies the principle of wrong and right behavior. In a research study, it is explained as the principles of suitable conduct to direct research, and as a procedure to respect and protect the respondents' welfare, dignity and rights in a multitude of varying research disciplines and methods (Abrar and Sidik 2019 :186). Thus, ethical consideration was of paramount importance in conducting this research. This study ensured that various participants' rights were protected during the research conduct. These included but were not limited to

(i) **Voluntary participation:** The study was completely voluntary, which allowed willing participants an opportunity to consent to their roles in it.

(ii) **Informed consent:** Participants who agreed to engage in the study were given consent forms (Appendix 3), which served as an agreement between the researcher and them, outlining the roles and responsibilities each party were taking towards one another throughout the research process. Participants then signed these consent forms as proof of willingness to participate.

(iii) **Letter of information:** Prior to commencing the interviews, a detailed letter of information (Appendix 2) was given to each participant to provide them with a detailed understanding of what the study entails and what is required from them.

(iv) **Confidentiality:** The confidentiality of participants was preserved through the anonymity of their identities and names during data collection, data analysis, and the presentation of findings. During the one-on-one interviews, a private environment was obtained with

carefully managed access to ensure that the researcher and the participant were in a private space to interact freely during data collection.

(v) **Potential for harm:** Participants were not put at any risk during participation. This also suggests that they were not asked to perform any acts or make statements that might have compromised them or caused them discomfort, diminished their self-esteem, or even caused them to experience embarrassment or regret.

It was suggested by Hasan *et al.* (2021 :1) that the ethical committee should review the study of all human subjects to ensure that adequate ethical standards are being followed. In pursuing this research study, the DUT-IREC gave clearance and approval for the study (Appendix 1), which then gave the researcher a clear way to proceed in conducting the study. The researcher then obtained permission from the gatekeepers: KZN DoH (Appendix 2b); the Health Districts managers of eThekwini (Durban) and uMgungundlovu (Pietermaritzburg) districts (Appendices 3b and 4b respectively); the hospitals' CEOs (Appendices 5b and 6b respectively); and lastly, the radiotherapy department managers of the two oncology hospitals (Appendices 7b and 8b respectively).

3.12 SUMMARY OF THE CHAPTER

This chapter provided details on the research methodology used to guide the study. The researcher described the qualitative phenomenological method as used in the study. In addition, the researcher thoroughly discussed the processes needed to be followed such as data collection, data analysis, and the trustworthiness of the study. The following chapter provides a presentation of the findings.

CHAPTER 4: PRESENTATION OF FINDINGS

4.1 INTRODUCTION

This chapter is a representation of the data findings gathered from conducting in-depth interviews with 10 radiation therapists employed at two public oncology hospitals within the KwaZulu-Natal province. The interview data was analysed for its relevance to the research questions. This was done with the aid of in-depth one-on-one interviews as well as notes. In this chapter, interviewees are briefly described. Subsequently, the data analysed is laid out into sub-themes that address the research question of the study.

The current study aims to explore radiation therapists' experiences of disruptions in radiotherapy service delivery and recommend strategies to support radiation therapists to provide ongoing optimal service during and post the pandemic era. This is set with the intention to successfully suggest and hopefully implement pandemic preparedness and a thorough response in radiotherapy in developing countries such as South Africa. The study's research questions as described in Chapter One were:

(a) What are radiation therapists' perceptions of radiotherapy service delivery at public oncology hospitals during the ongoing COVID-19?

(b) What are the facilitators to radiotherapy service delivery by radiation therapists at public oncology hospitals during the COVID-19 pandemic?

(c) What are the hindrances to radiotherapy service delivery by radiation therapists at public oncology hospitals during the COVID-19 pandemic?

(d) What strategies can be recommended to support radiation therapists to deliver optimal radiotherapy service during the ongoing pandemic?

The demographics section gathered characteristics of the participants and the interview section used open ended questions to gather data sufficient to

answer the research questions. These interviews were conducted at each participants' preferred setting free of distractions.

4.2 DEMOGRAPHIC DATA OF PARTICIPANTS

The data collected by the researcher was gathered using the sampling process outlined in Chapter 3, Section 3.5.1, which identified two hospitals within the KZN province. From these hospitals, 10 participants gave consent to participate in the study, with one participant partially completing the audio recorded interview but completed it through note-taking by the researcher, as well as one participant who fully declining audio recording during the interview, thereby resorting to the researcher applying note-taking.

From this data collection process, the demographic profiles of the individual radiation therapists that participated is given below (Table 4.1). The gender identity of the study revealed four males and six females. With regard to ethnicity, three of the male participants were black/African and the remaining one was white, while five of the female participants were black/African and the remaining one was classified as "other". The marital status of the participants revealed eight single participants, one married, and the other one widowed. Six of the participants fell between the ages of 31-40 years old, two were between the ages of 21-30 years old, and an equal number of two participants were between the ages of 41-50 years old. There was a common occurrence of work experience between 1-10 years for seven of the interviewed participants; whilst one participant had 11-20 years of experience and the remaining two participants had between 21-30 years of work experience. The participants were selected to randomly fill each position of employment within the department. Within these positions of employment, there were two senior radiation therapists working in treatment delivery; two managers holding the leadership position; three junior simulation radiation therapists; two senior planning radiation therapists; and one junior planning radiation therapist. Based on the data analysis of the interviews, the findings yielded the themes discussed in the next section.

Table 4.1: Demographic data of participants

Participant number	Gender	Ethnicity	Age in years	Marital Status	Work experience in years	Ranking	Work station
001	F	African	31-40	Single	1-10	Senior	Treatment
002	F	African	31-40	Married	1-10	Senior	Treatment
003	F	African	41-50	Widowed	21-30	Manager	Leadership
004	F	African	31-40	Single	1-10	Senior	Planning
005	M	White	21-30	Single	1-10	Junior	Simulation
006	M	African	41-50	Single	21-30	Manager	Leadership
007	M	African	31-40	Single	1-10	Junior	Simulation
008	F	African	31-40	Single	1-10	Junior	Simulation
009	M	African	21-30	Single	1-10	Junior	Planning
010	F	Other	31-40	Single	11-20	Senior	Planning

4.3 CONCEPTUALIZATION OF COVID-19 DISRUPTIONS IN THE DELIVERY OF RADIOTHERAPY SERVICES AS EXPERIENCED BY THE RADIOTHERAPISTS

From the thematic analysis used in analysing the study data, four themes emerged as follows:

- Changes in hospital settings, working conditions, radiotherapists' practices and wellbeing;
- Barriers to radiotherapy service delivery;
- Facilitators to radiotherapy service; and
- Support needed.

The researcher used the aforementioned themes to attain and discuss sub-themes, linking them accordingly as illustrated in Table 4.2 below. These themes and sub-themes are supported by quotations derived from the interviews conducted to gather data. The interviews were then transcribed and analysed to create justified proof that supports the research purpose. A sample of one of the interviews is provided as Appendix 9.

4.3.1 THEME 1: Changes in hospital settings, working conditions, radiotherapists' practices and wellbeing

When participants were asked about how it felt delivering radiotherapy service - during the COVID-19 pandemic, their opinions differed but they shared a similar aspect of fear due to the lack of preparedness during that time. To summate these opinions, sub-themes 4.3.1.1 to 4.3.1.4 emerged.

4.3.1.1 Complete shutdown

When conducting the study, the researcher discovered that one of the public oncology hospitals included in the study underwent a complete shutdown. Most of the participants interviewed from the hospital concerned stated that the hospital closure affected their patients, which ultimately affected their working conditions and wellbeing. The participants stated the following:

> *"This hospital in particular shut down for a while. No patients except the ones with COVID complications were allowed in unless they were emergencies."* **Participant 004, Female, Planning radiation Therapist**

> *"Our hospital had a complete shut down as soon as the pandemic hit. No one knew what to do to protect both patients and staff so closing the hospital momentarily in order to figure that out and receive a memorandum that would guide us all was the aim. From the hospital shutting down, there were new processes of triaging patients and only emergent cases were allowed into the hospital. No new referral patients could come into the oncology departments unless they were emergencies."* **Participant 003, Female, Leadership**

Table 4.2: Summary of themes and sub-themes

THEMES	SUB-THEMES
4.3.1 Changes in hospital settings, working conditions, radiation therapists' practices and wellbeing.	4.3.1.1 Complete shutdown
	4.3.1.2 Patients delayed commencement and completion of treatment
	4.3.1.3 Stressful environment full of anxiety
	4.3.1.4 Difficulty in coping with the stressful situation
4.3.2 Barriers to radiotherapy service delivery.	4.3.2.1 Lack of resources to facilitate continuous clinical service delivery
	4.3.2.2 Difficulty in clinical transitioning
	4.3.2.3 Absence of standard departmental protocols and advisories
	4.3.2.4 Poor communication
	4.3.2.5 Lack of education to ease both patients and staff
4.3.3 Facilitators to radiotherapy service.	4.3.3.1 Guidelines on how to continue radiotherapy work and still feel safe
	4.3.3.2 Standard approach to pandemics as managers to guide staff
	4.3.3.3 Implementation of shift-work to have less staff and comply with social distancing standards
4.3.4 Support needed.	4.3.4.1 Awarded appropriate guidance and adequate PPE
	4.3.4.2 Introduction of standard formulated protocols for infection control in a Radiotherapy department
	4.3.4.3 Virtual workshops on how radiation therapists can work safely under stressful conditions
	4.3.4.4 Management to continue providing PPE and adhere to hygiene protocols despite low COVID-19 infection rates

4.3.1.2 Patients delayed commencement and completion of treatment

Participants felt that the pandemic took a toll on their patients. They indicated the radiotherapy system was burdened with a prospective patient backlog from the hospital closure as well as the triaging of patient intake. As hospitals prioritized emergency care over standard care regimes, participants in the KZN public oncology hospitals expressed their concern for their patients who were delayed treatment commencement, and participants stated that this led to many patients falling out of their initial prognosis from disease progression. The following are extracted in support of this:

> *"…Patients on treatment were also affected, especially those who tested positive for the virus… It was a very huge challenge because they have to call them quarantine for like two weeks and you find that the cancer is not stopping. They're missing out on their treatment."* **Participant 007, Male, Simulation**

> *"In planning specifically, we had to continue pushing the load as usual but instead of planning let's say 15 patients a week, we came down to about five because we did not have space to put them in. This caused a delay in patients starting their treatment because the ones that were far back in the system ended up being for palliative treatment, most of them. Even the ones we had planned before COVID hit, some presented to us as palliatives so we had to rescan and re-plan to their new prescribed treatment."* **Participant 004, Female, Treatment planning**

> *"…but patients were definitely affected. We had to cut down on the workload in order to adhere to social distancing standards and that meant treating less patients than normal."* **Participant 005, Male, Simulation**

> *"A lot of our patients stayed at home, not only in fear of contracting the virus, but because it was difficult to enter the hospital unless they were deemed an emergency case. This delayed the patients from commencing their treatment and those that were already on treatment*

were delayed by the hospital closure and ended up needing treatment alterations in order to successfully complete their radiation treatment." **Participant 003, Female, Leadership**

One of the participants was of the strong opinion that some patients may have feared reporting to hospitals because of the fear of contracting the virus*:*

"*…Patients feared coming to hospitals when infection rates increased…but I also think our patients should have been part of the ones prioritized because most of them showed up a little later, some with advanced symptoms than when they were first seen by oncology doctors…I remember how sad it was to have to rescan patients because of the delay."* **Participant 007, Male, Simulation**

4.3.1.3 Stressful environment full of anxiety

It is an obvious observation that the COVID-19 pandemic had a strong impact on every one within the world's population. Conducting the study also proved that this was prominent in radiation therapy for both patients and staff. A study by Vicinanza *et al.* (2022: 1) supported that since the COVID-19 outbreak, cancer patients were further concerned about the risk of severe complications related to a possible severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection due to their immunosuppressive state. During the interviews, participants raised concern for the psychological impact the pandemic had on them. They mentioned that in their clinical setting, there was significant anxiety and stress environment from both patients and staff. Both participants in the management rank had the following say:

"I think because everyone was so scared and wanted to protect themselves as much as they can, it became a little tense in the department. People were just stressed and it showed in their daily moods." **Participant 006, Male, Leadership**

"COVID caused everyone a lot of anxiety and stress, and I was no different. I was frustrated most of the time because no matter how much I tried to steer the ship forward, there would always be a block." **Participant 003, Female, Leadership**

"It was such a depressing time for us as healthcare workers to exist in… I could not take away every staff member's anxiety nor fear to be at work during that difficult time." **Participant 003, Female, Leadership**

More participants on the floor expressed how anxious they were to be at work during the pandemic and, more than anything, they were anxious to be dealing with immunocompromised patients during this time. Some participants feared the possibility of acquiring the virus from the hospital setting and passing on the infection to their loved ones at home, causing a rise in stress. These were some of their thoughts:

"…so, I felt vulnerable to contracting COVID and I was also quite worried about my parents…So, I was extremely worried about them contracting COVID and me being the one taking it home, resulting in them getting it." **Participant 005, Male, Simulation**

"Mentally, I was tired. There were so many stressful days whereby when you have to wake up in the morning and come to work, you feel like okay, you're not ready for this day because like every day is going to be a different situation. And you need to make sure that in all situation we are coping with whatever that is happening." **Participant 008, Female, Simulation**

4.3.1.4 Difficulty in coping with stressful situations

Most participants experienced difficulty in dealing with the stress surrounding them as they continued service delivery during the pandemic. The sudden changes in standard radiotherapy practice created a sense of pressure to

continue optimal performance without necessary support. This caused a psychological shift for radiation therapists and left them distressed. They stated the following:

> *"I am still learning to cope with the trauma COVID brought. As managers, we are often expected to deal with medical emergencies in an objective manner and that affects us because we are still human and we were always trained to have empathy."* **Participant 003, Female, Leadership**

> *"It was very difficult but we didn't stop working as a team because we knew that is the only way to survive, we relied on each other as a support system to cope through those times."* **Participant 006, Male, Leadership**

> *"The department would be short-staffed and we struggled, we were pushed to the limits where we had to do over time and we were burned out."* **Participant 007, Male, Simulation**

4.3.2 THEME 2: Barriers to radiotherapy service delivery

From the participants' perspectives, the impact of COVID-19-related changes in radiotherapy service delivery was impeded by multiple factors, some presented as sub-themes 4.3.2.1- 4.3.2.5 below.

4.3.2.1 Lack of resources to facilitate continuous clinical service delivery.

Moreover, the participants highlighted that there were insufficient resources to help them continue service delivery, which extended to the lack of PPE provided by the hospitals, and even human resources as they contracted the virus and were quarantined. The quotations below verify this:

"…with the hospital not offering or giving us enough PPE or masks to even begin with. It now means that we must provide for ourselves." **Participant 002, Female, Treatment**

"…And there's quite a bit of us, you know, like human resources (like RTs) that are we working around here. So, we would have the difficulty in structure…" **Participant 001, Female, Treatment**

I'd obviously say staff contracting COVID and then being booked off because they have contracted COVID. That's was a major setback, that meant we have one staff member down." **Participant 005, Male, Simulation**

"We had to follow the rules of social distancing, washing hands, changing PPE every day and we did not even have enough of that. We did not even have the space to social distance patients in our waiting areas but we made it work." **Participant 006, Male, Leadership**

4.3.2.2 Difficulty in clinical translation

Participants expounded that adapting to the new clinical environment seemed to be a difficult transition for them. During this era, participants indicated that they were expected to apply hygienic methods after each patient, work shifts, triage patients to treat, as well as rule out their way of working in close proximity, even when dealing with patients. The following statements support this:

"Because we could not even work virtually like most companies offered their employees in South Africa, we had to find a way to continue to work with only two treatment planning computers to push the load. We had to take turns working on them almost like shift, to

say one will work from morning to no, wipe it down ad hand it over to the next person. This never used to happen because before we could work on a treatment plan together as planning radiotherapists. Even passing plans with doctors was hard because we are supposed to sit side by side as you explain the plan to them, so it was difficult to adjust." **Participant 004, Female, Planning**

"…maybe the HOD will walk in as an example and be like "you're too close! social distancing", How am I supposed to do a mask?... because as RTs, we are touching things together, measuring things together." **Participant 001, Female, Treatment**

4.3.2.3 Absence of standard departmental protocols and advisories

Participants felt strongly about the inconsistent, or rather absent, protocols and advisories that guided service delivery. In relation to this, the researcher noticed that a majority of the participants were disappointed with changes that were constantly made to the protocols. The following statements were made in support of this:

"It was also very difficult because although there were guides and protocols to how we need to respond to the pandemic, but there were no proper guidelines. So, it was very scary." **Participant 009, Male, Planning**

"It would have been nice to have standard formulated protocols that were reviewed by the infection control team that somewhat protect the radiation therapy staff and its patients in order for us to continue to have a smooth workflow." **Participant 003, Female, Leadership**

4.3.2.4 Poor communication

The COVID-19 pandemic brought a huge scare to everyone, including those in the Healthcare industry. This caused a major communication dip as those at the top of the employment pyramid did not have exact facts to report back to those at the bottom. Furthermore, with the anxiety and fear that came with the pandemic, many radiation therapists failed to openly cope and communicate with fellow colleagues. A number of participants agreed with this and supported it with subjective opinions:

> *"'…maybe if I was in a different setting, maybe I'd get more chances to be more vocal about how I think things should work out…"* **Participant 001, Female, Treatment**

4.3.2.5 Lack of education to ease both patients and staff

In cancer care, patient education is crucial and supports patients' general wellbeing and psychological care. However, as the pandemic hit, oncology centers saw less patients come in to seek care due to the fear of possible viral contraction. Participants mentioned a similar contributing factor to this, which is poor education on COVID-19. Both radiation therapy staff and patients relied on media as the information hub as there were no education programs. As a result, patients steered clear of hospitals regardless of their diagnoses while staff continued with unguided clinical service delivery. Participants expressed the following sentiments on the matter:

> ***"****As radiation therapists from public hospitals, we see all these patients from low socio-economic background, to middle class. So, they tend to not be well informed in terms of all these COVID-19 regulations and stuff."* **Participant 007, Male, Simulation**

"I think we need to have more knowledge in terms of how this COVID behaves, you know. So, the more understanding people get to know the disease, the better." **Participant 009, Female, Planning**

"It is human nature to stress and have feelings of anxiety. However, education on the pandemic is always helpful." **Participant 010, Female, Planning**

4.3.3 THEME 3: Facilitators to radiotherapy service

It is important that radiotherapy department implement assisting tools in continuing high standards of clinical service delivery to their cancer patients. An idea of these facilitators is mentioned as the following sub-themes.

4.3.3.1 Guidelines on how to continue radiotherapy work and still feel safe

Interviewed radiation therapists mentioned that to avoid disruptions to service delivery, they needed standard departmental guidelines to assist them in continuing service delivery during the pandemic. Most participants stated that these would ensure their safety and improve staff morale for continuous work, even post-COVID. The following quotes illustrate this:

"I think radiotherapy departments across the nation need to work together to come up with mitigation strategies that suit this department so that we can all cope with upcoming or existing COVID strands." **Participant 006, Male, Leadership**

"…as a health care provider, I will say the guidelines were in standard because they were approved by the World Health Organization, but we could use with radiotherapy specific guidelines as we work closely with patients." **Participant 008, Female, Simulation**

4.3.3.2 Standard approach to pandemic as managers to guide staff

One participant who is in the leadership rank suggested that as part of the support, it would be of great help if the national radiation therapy department managers were allocated standardized approaches to familiarize themselves with, and later guide their staff according to them.

> *"I feel we need to be given some form of standard approach to pandemics as managers so that we are able to lead our teams confidently when the time comes*." **Participant 003, Female, Leadership**

4.3.3.3 Implementation of shift-work to have less staff and comply with social distancing standards

Social distancing was one of the major international strategies to mitigate viral spread. Participants reported the introduction of working shifts in the Radiotherapy department in order to adhere to this strategy and still provide optimal service to their patients.

> *"So, we obviously had to deviate from our normal working conditions and included changes such as working shifts so that the number of staff members in each unit can adhere to social distancing standards."* **Participant 003, Female, Leadership**

> *"Yeah, I think the only thing that changed was when we introduced the shift work which was like day in and day out, so that we try and avoid the quick spread of the virus."* **Participant 008, Male, Planning**

4.3.4 THEME 4: Support needed

Support from the public oncology hospitals' higher management can help the radiation therapy departments' readiness in combating the virus and ensuring that staff feels supported while they carry on their daily duties.

4.3.4.1 Awarded appropriate guidance and adequate PPE

Although participants mostly reported the lack of PPE in their radiation therapy departments, floor managers should be awarded an opportunity to enquire for the supply of these to ensure that low infection rates remain so.

> *"I can say that's the support we needed, more sanitizers and masks because they were rare and when we had them some of the staff members would even take them for their families. Maybe to also have masks for patients would have been a good support because they often showed up with old, dirty masks."* **Participant 004, Female, Planning**

> *"We needed higher management to provide us with more PPE supply to prevent the very staff from contracting the virus and possibly spreading it amongst each other*." **Participant 003, Female, Leadership**

4.3.4.2 Introduction of standard formulated protocols for infection control in a radiotherapy department

Although participants worked against all odds during the peak of the pandemic, most felt that they could have performed better with the support from infection control, especially if they had standardized protocols from the department.

> *"I think the hospital should have also considered our department when carefully planning out preventative measures. We need to have mitigation strategies for cancer patients such as good testing stations and maybe have temporary isolation wards for them to quarantine while still being available for treatment."* **Participant 006, Male, Leadership**

4.3.4.3 Virtual workshops on how radiation therapists can work safely under stressful conditions

When asked about the support required to continue service delivery, participants responded that the introduction of frequent virtual workshops to

guide them on continuing and further improving their work as pandemic waves come and go would be appreciated.

> *"I think also having meetings or virtual workshops that would have taught radiation therapists strategies to safely work while under stress without jeopardizing patients would have been a great help."* **Participant 003, Female, Leadership**

4.3.4.4 Management to continue providing PPE and adhere to hygiene protocols despite low COVID-19 infection rates

The use of PPE was highly advised and encouraged during the pandemic. However, the participants feel that the rules around this matter should still apply, even in recent times considered as post the pandemic.

> *"I would like for us to continue using PPE and adhering to the hygiene protocols that were set during the peak of COVID.*" **Participant 003, Female, Leadership.**

4.4 SUMMARY OF THE CHAPTER

This chapter presented the findings of the research. Four main themes and a number of sub-themes emerged from the data analysis. The next chapter will discuss the aforementioned findings based on the data analysis and interpretation done in this chapter.

CHAPTER 5: DISCUSSION OF FINDINGS

5.1 INTRODUCTION

The previous chapter presented the results of the study as themes. This chapter aims to discuss these results based on the data analysis and subsequent interpretation of the experiences of radiation therapists' disruptions in clinical service delivery during the COVID-19 pandemic in public oncology hospitals in KZN. Guided by Colaizzi's Seven-step method of data analysis, the researcher used the interview transcripts as well as hand-written notes to interpret and simulate themes and sub-themes for the study.

The current chapter will discuss the demographic profiles of the study participants in order to provide unbiased opinions of the radiation therapists interviewed. Conelly (2013: 269) described demographic data as a tool that allows for a description of participants' characteristics. This is done to avoid a biased sample selection and ensure that sought out participants have an equal inclusion opportunity. Thereafter, the study themes and sub-themes are discussed. To recap, the themes that emerged are: Changes in hospital settings, working conditions, radiation therapists' practices and wellbeing; Barriers to radiotherapy service delivery; Facilitators to radiotherapy service, and lastly, the support needed.

The researcher finally merges the study results in relation to the aims, and ultimately concludes with a summary. To recap, the aim of the current study was to explore radiation therapists' experiences of disruptions in radiotherapy service delivery and recommend strategies to support radiation therapists to provide ongoing optimal service.

5.2 DEMOGRAPHIC PROFILES OF PARTICIPANTS

The participants were all employees at public oncology hospitals in KZN, from the eThekwini and uMgungundlovu districts. They are all qualified radiation therapists registered with the HPCSA (Health Professions Council of South Africa). These participants were from different working stations within the Radiotherapy departments. They have all worked under COVID-19 conditions, during its peak to its gradual fall off. Thus, this part of the study comprises different demographic components to avoid biased sampling.

5.2.1 Gender

As shown in Table 4.1, the method of selecting participants was random and allowed both genders, male and female, to participate without restriction. During the analysis of this data, it is notable that 70% (n=7) of the participants were female and the remaining 30% (n=3) were male. Gender, as a demographic component, defines the variance in sex roles.

5.2.2 Ethnicity

Ethnicity is associated with race, and both social constructs are defined as concepts developed within a given society's cultural context (Suyemoto, Curley and Mukkamala 2020: 81). Overall, there is a major percentage of 80% (n=8) of African participants in the study. This only reflects on the presence of employees at the chosen institutions, rather than deliberate ethnical consideration by the researcher. To prove this, 10% (n=1) of the participants were of other ethnic groups and the remaining 10% (n=1) was white. This ensured that the inclusion criteria of the study focused on the professional radiation therapists as a whole in order to gather the required data.

5.2.3 Age in years

The study findings showed that most participants, specifically 60% (n=6), were between the ages of 31-40 years, while 20% (n=2) of the participants were ranging between 21-30 years of age, and a similar percentage of 20% were between 41-50 years of age. The participants' age difference reflected a variance in years of experience and the different opinions that each participant holds. It is assumed that the older the participants, the longer experience they have in the radiotherapy profession, thus having seen prior pandemics and measures taken against them. Younger professionals are not excluded as they also have newer, innovative ways of thought processes and have added great value to the study. The study was balanced in this regard, having included radiotherapists of all ages.

5.2.4 Marital status

In the analysis, 10% (n=1) of the participants were married, 10% widowed, and the remaining 80% (n=8) were single. The participation of radiation therapists selected for this study allows for non-biased participation, thus radiation therapists were randomly selected and had different marital statuses.

5.2.5 Work experience in years

Participants' work experience ranged from 1-20 years. The researcher recorded 70% (n=7) of radiation therapists working on the floor with work experience between 1-10 years; 10% (n=1) of participants in treatment planning with a work experience of 11-20 years; and 20% (n=2) of participants in management with work experience between 21-30 years.

5.2.6 Ranking

In conducting the study, the different hierarchical levels of employment reported participants in senior, junior and management positions. Within the senior rank of employment, 20% (n=2) of the participants worked in the treatment units and 20% in planning. The junior ranking presented 30% (n=3) of participants working in simulation and 10% (n=1) in planning. The remaining 20% of participants were in management positions working as the leaders of both departments separately.

5.2.7 Work station

The vast difference in the participants' positions of employment allowed for participants in each work station to give their opinions of the experiences of clinical service disruptions during the COVID-19 pandemic without the influence of their colleagues. Opinions were gathered from participants in treatment (20%), planning (30%), simulation (30%), and leadership (20%). Participants in this variable demographic component expressed similar experiences of high anxiety and poor support to continue providing optimal clinical service delivery during the pandemic. Moreover, a study by Buglione *et al.* (2020: 3-4) showed that Western countries such as Italy saw a relative shortage in personnel throughout the department due to the contraction of the virus. However, this was remedied by a temporary re-allocation to continue service delivery. This demonstrates the irregularities in government support between developed and developing countries.

5.3 DISCUSSION OF THEMES

The current study explored the radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in the KZN province. As illustrated and explained in Chapter 2, the study was guided by Kurt Lewin's Change Theory. Using this theory and the concepts in the literature review of previous studies assisted the researcher to understand and describe the ongoing COVID-19

disruptions in the delivery of radiotherapy service as experienced by radiation therapists.

The study found that through interactive forecasting during interviews, this resulted in the organised meanings of the participants' statements into themes, namely: Changes in hospital settings, working conditions, radiotherapists' practices and wellbeing; Barriers to radiotherapy service delivery; Facilitators to radiotherapy service; as well as Support needed. These themes are thoroughly discussed below.

5.3.1 Changes in hospital settings, working conditions, radiation therapists' practices and wellbeing

The findings of this study suggest that the majority of the participants found that hospitals could not sustain service delivery during the peak of the pandemic era. There was seen to be a complete shutdown of one of the concerned public hospitals due to the lack of preparatory tools aimed at continuing service delivery within the hospitals. A study by Filip *et al.* (2022: 2) supported that public health systems were not prepared to combat the novel viral pathogen that had rapidly spread across the globe, as containment measures were porous and inadequately implemented at the most crucial period. Thus, some hospitals had to close down for a while. From this shutdown, the hospital concerned implemented a triage plan where only emergency cases were allowed into the hospital.

One of the participants who is in a management position explained that the hospital shutdown caused a shift in the radiotherapy service delivery as new cancer patients could not report in to be seen and assessed to commence their treatment unless they were in a dire situation. Concurrently, patients who were already on treatment also had to stop reporting for sessions until strict COVID-19 measures were implemented, resulting in repeated damage to the radiotherapy service delivery. This essentially means that there was no service delivery during this time and patients fell back on their treatment schedules. As a result, participants in this study informed the researcher that

new patient numbers in the oncology department decreased at the peak of the pandemic and dramatically increased as the pandemic waves eased down. Erdoğan *et al.* (2022: 1) support that like in South Africa, cancer patients in countries such as China and Singapore also experienced psychosocial influences that manifested from fear. These included depression, anxiety, panic attacks, post-traumatic trauma, amongst others. The same authors maintained that these factors affected the patients' level of decision-making as they had to choose between seeking cancer care and avoiding hospitals to escape the likelihood of infection.

Radiation therapists in public oncology hospitals struggled to continue clinical service delivery. Participants mentioned that it was a "sink or swim" situation where they had to figure out how to continue serving their patients whilst protecting themselves from possible infection or possibly infecting their immunocompromised patients. When asked about their wellbeing due to the changes in radiotherapy service delivery during COVID-19, one participant expressed that a lot of pressure was put on them to continue providing optimal service delivery. The same participant stated that this made them anxious and created a very stressful work environment as they felt that they were at high risk of getting infected. More participants claimed that they had to harbour their feelings in order to keep the department afloat by providing continuous cancer care in order to prevent backlogs. Morassaei *et al.* (2021: 407) reported that previous research from past epidemics as well as recent research on the current COVID-19 pandemic indicated that healthcare professionals around the globe can experience changes to their mental health as a result of working during these events. These range from anxiety to post traumatic stress disorder from working under life-threatening conditions with minimal guidance from the government.

5.3.2 Barriers to radiotherapy service delivery

In relaying their lived experience, the participants seemed to have a common narrative of insufficient resources in both institutions, and that sufficient

resources would have allowed them to continue delivering optimal clinical service to cancer patients. Of these resources, participants were mostly concerned about the lack of PPE to ensure that they are protected from possible viral infection while treating patients, as well as the shortage in human resources (staff) as they contracted the disease and remained at home until the symptoms resolved. According to an article by Kearney *et al.* (2021: 19), healthcare resources were limited, with PPE shortages widely reported due to ongoing or recurrent COVID-19 outbreaks. In supporting this, a participant in the managerial position reported that there was a gap in human resources due to radiation therapists gradually contracting the virus and having to employ the national quarantining protocols, leaving the department skeleton-staffed. There was also a strong sense of commotion when it came to allocating staff. The remaining healthy staff members had to carry the load of treating all the cancer patients.

In response to the threats imposed by the pandemic, the radiation therapists interviewed expressed how difficult it was transitioning into the COVID-19 era. They mostly expressed the poor communication during this time; the fear of continuing work with the absence of standard departmental protocols; as well as the lack of education to ease both patients and staff. Bernabucci *et al.* (2022: 666) reported that the absence of guidance from scientific literature by nature leads to less-consistent practices. The current study indicated the absence of standard protocols and adversaries, since about 20% of participants proclaimed that there was an absence of reflective documentation providing advisories to minimise the risk of spread and encourage the continuation of service delivery in radiation therapy departments. The notion was to continue radiotherapy clinical service delivery regardless of how inconsistent the conditions were.

Participants in this study reacted and responded similarly when asked about the changes in working conditions due to changes in radiotherapy service delivery during the COVID-19 pandemic. During the interviews, the

researcher found that most participants were not satisfied with the communication channels used to communicate information related to the pandemic to them. The majority of participants feel that the pandemic silenced them, especially since no one was sure on how to act and when to react. Participants were of the opinion that communication skills were a major setback during the era as no one communicated exactly what they needed to do, when, and how. For instance, one participant mentioned that even the quarantining time kept on changing and their management would not provide enough information to them regarding the reasons for this. Other participants described the communication issue amongst themselves, stating that there was no openness or transparency from radiation therapists to each other. Contrary to this happening in South Africa as a developing country, Reuter-Oppermann *et al.* (2020: np) led a study that showed that developed countries such as Germany, Austria and Switzerland ensured that they provided cancer care to patients in need as justly and as safely as possible. The same authors maintained that hospitals in this region were more concerned about delivering serviced to the patients, hence the willingness to collect implementation information in order to understand their own level of preparedness.

Participants in the current study also suggested that there be continuous education systems that work towards updating patients and radiation therapists of ways and means to continue service delivery while protecting themselves during this important interaction. A study by Bernabucci *et al.* (2022: 293) supported that all professionals should be adequately trained and periodically updated on the clinical features of COVID-19, the risk of exposure, the correct use of PPE and available prevention and protection procedures. Thus, participants in this study continue to acknowledge and recommend that the government incorporate psychosocial support and continuous educative interventions in order to ease both patients and staff anxiety during the pandemic era.

5.3.3 Facilitators to radiotherapy service

The findings of the current study suggest that most of the participants found it difficult to adjust to the new way of delivering services. This unanimous opinion arose from the abrupt changes that had to be implemented, such as shift work to have less staff in one unit and complying with social distancing. This particular factor put a lot of pressure on participants to continue carrying out their daily tasks and create a smooth workflow. A study by Kearney *et al.* (2021: 19) indicated that there were similarities in the Western hemisphere where radiotherapy workflow procedures adopted for COVID-19 included implementing approaches such as ‘‘split team” (51%), ‘‘staggered appointment times” (49%) and ‘‘hot LINAC” (51%) to minimise the number of patients and staff in the department at the same time, as well as to avoid potential exposure and transmission across the entire radiotherapy team. Similarly, the Radiotherapy departments in question had to employ shift work in order to reduce the backlog by treating cancer patients so that they do not fall behind and fall out of their prognosis as per their treatment plans.

In radiotherapy, cancer care is commenced and continued without a break in between, except for weekends and holidays, which are taken into account when planning the treatment. Radiation therapists in this study reported a pause in this service due to a lack of guidelines on how to continue working and still feel safe. Given the transmissible rate of COVID-19, radiation therapists, like every other healthcare professional, were responsible for ensuring that both themselves and their patients do not get exposed to the virus. To continue clinical service delivery, participants said that they had create rules such as using separate waiting areas for patients in order to adhere to the national standard of social distancing. However, one participant highlighted that this delayed treatment time as they had to walk a distance to call patients in for treatment, and the same participant added that some patients would be seen wearing the same mask for over a number of days, which defeats the purpose in terms of cross-contamination and possible viral spread. Galofaro *et al.* (2021: 3324) conducted a study that confirmed that the main challenge is to reduce the departments’

overcrowding by lowering the admission rate to Radiotherapy departments. According to the authors, this attempt has two different purposes. Firstly, fewer visits to the radiotherapy centre can reduce the risk of contagion for healthcare workers. This lowers risk, besides protecting the staff, and minimizes the need for radiotherapy delays and interruptions. Secondly, reducing the departments' crowding decreases the contagion risk for patients undergoing radiotherapy. This proved that although there was a lack in official guidelines, Radiotherapy departments around the world attempted viable alternatives as their mitigation strategies.

Managers in the study were uncertain about their role in leading staff on how to cope and continue service delivery during the pandemic era. They felt compelled to continue guiding their staff whilst also lacking knowledge on how to successfully do this. Participants in the managerial position shared the feeling that they should be familiarized with standard approaches to pandemics, including the COVID-19 pandemic, by the higher management in order for them to effectively support and guide their staff.

5.3.4 Support needed

During the interviews, the participants were asked about any improvements they required in the support structures for them to cope and continue optimal service delivery during the pandemic regardless of the low infection rates. A majority of the participants, especially one in the managerial position, stated that they would appreciate being given appropriate guidance and adequate PPE from senior management. This should be together with standard formulated protocols for infection control in the radiotherapy department. According to Tsang *et al.* (2020: 7), in order to continue with a smooth and safe workflow, radiation therapists can wear face masks and strictly follow appropriate hand hygiene when setting up all patients in the department. Strict hand hygiene must be followed before and after removing some, or all, of the PPE. Although participants reported a lack in infection-controlling PPE, using the available PPE frequently and correctly should encourage floor managers to request for more from the senior management or the infection

control team. Therefore, the department is assured low rates of infection and continuous service delivery.

The study further indicates that the radiation therapists in the radiotherapy departments of these public oncology hospitals required virtual workshops on how radiation therapists can work safely under stressful conditions as part of improved support. Thus, there should be a prospective re-organisation or re-planning of mitigation strategies in radiotherapy, where frequent virtual workshops or meetings can be hosted to discuss new adaptations in Radiotherapy practice in response to COVID-19. Tsang *et al.* (2020: 8) supported that an internal communications plan should be established to ensure continuous communication from the senior administration to clinical radiation therapists. Regular team meetings should also take place online between radiation therapists who are physically on site at the radiotherapy department and those who are remote working. A study by Slotman *et al.* (2020: 41) added a summated comparison of data between the European countries and America and found that the radiation Oncology community immediately organised itself with joint efforts to ensure continuity of therapies while protecting patients, healthcare professionals and the general population. These measures included no visitors in radiotherapy departments, telemedicine for follow-up visits and clinical multidisciplinary evaluations; the use of PPE for each patient treatment; screening of radiation therapists prior to each shift, as well as staggered shift scheduling. These are exemplary measures that can be implemented in the concerned public oncology hospitals.

Moreover, management can be encouraged to continue providing PPE and motivating staff to adhere to hygiene protocols despite low COVID-19 infection rates. With the ever-evolving COVID-19 virus, it is important that radiation therapists adhere to strict measures that ensure their safety as well as the patients' safety. Managers of these departments need to be familiarised with the infection control team in order to have access to resources such as soap for handwashing, sanitizers for cleaning of surfaces

and hand sterility, as well as restocking of PPE such as gloves, masks and gowns.

5.4 FINDINGS IN RELATION TO THE AIMS OF THE STUDY

This current study aimed to explore radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province. The aim of the study was achieved as it resulted in the themes discussed above. The research questions to conduct interviews that led to these themes were as follows:

(a) What are radiation therapists' perceptions of radiotherapy service delivery at public oncology hospitals during the ongoing COVID-19 pandemic?

To summate their perceptions, almost all the participants expressed fear as the foremost feeling they had during the onset of the pandemic. They were concerned about contracting the virus and infecting their loved ones. The participants were of the opinion that hospitals could not sustain service delivery during the peak of the pandemic era due to a complete shutdown of one of the public oncology hospitals and lack of preparatory tools aimed at continuing service delivery within the hospitals. Some hospitals had to close down for a while. From this shutdown, the hospital concerned implemented a triage plan where only emergency cases were allowed into the hospital.

Furthermore, there was a shift in the radiotherapy service delivery as new cancer patients could not report in to be seen and assessed to commence their treatment unless they were in a dire situation. Concurrently, patients who were already on treatment also had to stop treatment until strict COVID-19 measures were implemented, resulting in more disruptions to the radiotherapy service delivery as patients' treatment were delayed. Additionally, the numbers of new patients in the oncology department decreased at the peak of the pandemic and dramatically increased as the pandemic waves eased down. Ultimately, radiation therapists struggled to continue clinical service delivery. A lot of pressure was put on them to

continue providing optimal service delivery and this created a very stressful work environment as they felt that they were at high risk of getting infected with minimal guidance from the government.

(b) What are the hindrances to radiotherapy service delivery by radiation therapists at public oncology hospitals during the COVID-19 pandemic?

The participants from both hospitals seemed to have a common narrative of insufficient resources that prevented them to continue delivering optimal clinical service to cancer patients. They were mostly concerned about the lack of PPE to ensure that they are protected from possible viral infection while treating patients, shortage of staff as they contracted the disease and remained at home for quarantine leaving the department skeleton-staffed. The remaining healthy staff members had to carry the load of treating all the cancer patients.

To respond to the pressures enforced by the pandemic, the radiation therapists interviewed expressed how difficult it was transitioning into the COVID-19 era. They mostly expressed the poor communication during this time; the fear of continuing work with the absence of standard departmental protocols; as well as the lack of education to ease both patients and staff. The study indicated the absence of standard protocols and adversaries, since about 20% of participants proclaimed that there was an absence of reflective documentation providing advisories to minimise the risk of spread and encourage the continuation of service delivery in Radiation Therapy departments. The notion was to continue radiotherapy clinical service delivery regardless of how inconsistent the conditions were.

Additionally, most participants were not satisfied with the communication channels used to communicate information related to the pandemic to them. They were of the opinion that communication skills were a major setback during the era as no one communicated exactly what they needed to do,

when, and how. For instance, the quarantining time kept on changing and their management would not provide enough information to them regarding the reasons for this.

(c) What are the facilitators to radiotherapy service delivery by radiation therapists at public oncology hospitals during the COVID-19 pandemic?

The findings of the current study suggest that most of the participants found it difficult to adjust to the new way of delivering services. This unanimous opinion arose from the abrupt changes that had to be implemented, such as shift work to have less staff in one unit and complying with social distancing. This particular factor put a lot of pressure on participants to continue carrying out their daily tasks and create a smooth workflow. The Radiotherapy departments had to employ shift work in order to reduce the backlog by treating cancer patients so that they do not fall behind and fall out of their prognosis as per their treatment plans.

To continue clinical service delivery, participants said that they had create rules such as using separate waiting areas for patients in order to adhere to the national standard of social distancing. Galofaro *et al.* (2021: 3324) conducted a study that confirmed that the main challenge is to reduce the departments' overcrowding by lowering the admission rate to radiotherapy departments. According to the authors, this attempt has two different purposes. Firstly, fewer visits to the radiotherapy centre can reduce the risk of contagion for healthcare workers. This lowers risk, besides protecting the staff, and minimizes the need for radiotherapy delays and interruptions. Secondly, reducing the departments' crowding decreases the contagion risk for patients undergoing radiotherapy.

Managers in the study were uncertain about their role in leading staff on how to cope and continue service delivery during the pandemic era. They shared the feeling that they should be familiarized with standard approaches to pandemics, including the COVID-19 pandemic, by the higher management in order for them to effectively support and guide their staff.

(d) What strategies can be recommended to support radiation therapists to deliver optimal radiotherapy service during the ongoing COVID-19 pandemic?

The participants stated that they would appreciate being given appropriate guidance and adequate PPE from senior management. Furthermore, the radiation therapists indicated that there should be a prospective re-organisation or re-planning where frequent virtual workshops or meetings can be hosted to discuss new adaptations in Radiotherapy practice in response to COVID-19. These measures included no visitors in Radiotherapy departments, telemedicine for follow-up visits and clinical multidisciplinary evaluations; the use of PPE for each patient treatment; screening of radiation therapists prior to each shift, as well as staggered shift scheduling. These are exemplary measures that can be implemented in the concerned public oncology hospitals.

Moreover, management can be encouraged to continue providing PPE and motivating staff to adhere to hygiene protocols despite low COVID-19 infection rates. The radiation therapists should adhere to strict measures that ensure their safety as well as the patients' safety. Managers of these departments need to be familiarised with the infection control team in order to have access to resources such as soap for handwashing, sanitizers for cleaning of surfaces and hand sterility, as well as restocking of PPE such as gloves, masks and gowns.

Also, management training is necessary to continue guiding radiation therapists and psychosocial support in order to alleviate the stress and anxiety carried by radiation therapists should be prioritized within the Radiotherapy department.

5.5 SUMMARY OF THE CHAPTER

This study was conducted with the aim of exploring and describing Radiation therapists' lived experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in the KwaZulu-Natal province. The purpose of this research was to understand how the radiation therapists delivered radiotherapy services during COVID-19 in order to discover the support they need to provide ongoing cancer care. To conclude the research, the next chapter will summarise the limitations, recommendations, and areas of study for the future.

CHAPTER 6: STUDY LIMITATIONS, RECOMMENDATIONS, AND CONCLUSION.

6.1 INTRODUCTION

This chapter summarizes the findings of the study and highlights the limitations as well as recommendations. The chapter ultimately concludes with a summary. The aim of the study was to explore radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic and recommend strategies to support the radiation therapists to provide ongoing optimal service at public oncology hospitals in the KZN province. Data collection was attained through conducting face-to-face interviews with 10 participants, using open-ended questions with probing. The next section will provide the summary of the findings from conducting the study.

6.2 SUMMARY OF THE FINDINGS

In analysing the study findings, the researcher used Colaizzi's Seven-step method of data analysis. Data collected from the interviews yielded four major themes, namely Changes in hospital settings, working conditions, radiotherapists' practices and wellbeing; Barriers to radiotherapy service delivery; Facilitators to radiotherapy service; and Support needed. Each of these themes is summarized below.

6.2.1 Changes in hospital settings, working conditions, radiotherapists' practices and wellbeing

It is imperative that hospitals carry the unconditional role of continuing service delivery regardless of the state of the global environment. As pandemic waves interchange, the government should encourage continuous operations of hospitals regardless of the COVID alert Levels. During the peak of the COVID pandemic, public hospitals were seen to be under distress and most resorted to solely attending to emergent cases and neglected acute

conditions. This is an injustice to patients as the public in need of medical intervention because it pulls them back into the system, specifically cancer patients who are most likely to fall out of their radical prognosis when left unmanaged. This spontaneously affects the working conditions of radiation therapists and ultimately affects their wellbeing. When the radiotherapy service is not provided at optimal levels to already immunocompromised patients, radiation therapists feel that they are failing their patients by limiting them to therapy. This in turn creates a hostile environment filled with anxiety. Radiation therapists then tend to be anxious and find it difficult to carry out their duties at their best professional level.

6.2.2 Barriers to radiotherapy service delivery

The World Health Organization (WHO) stated that the highest attainable standard of health is a fundamental right for every human being (Abdel-Wahab *et al.* 2023: 827). In Radiotherapy, cancer patients are treated with radiation along with other modalities in order to improve patients' quality of life, thus radiation professionals needed to continue fulfilling this purpose during the pandemic. However, there were barriers in the radiotherapy field that hindered the continuation of service delivery during the COVID-19 pandemic. These included:

- The lack of resources such as PPE and human resources to facilitate continuous clinical service delivery.
- Staff fatigue and operational changes as they transitioned from their normal working conditions into COVID-19 restricted conditions.
- The absence of standard departmental protocols and advisories to guide radiation therapists as they continued service delivery during the pandemic.
- Poor communication amongst radiation therapists and management that would pave the way to an agree on how to continue putting cancer patients first whilst not compromising themselves.
- The introduction of shift-work to minimize the number of radiation therapists on the floor and comply with social distancing standards.

6.2.3 Facilitators of radiotherapy service

The introduction of facilitators to continue safe service delivery during the pandemic is pivotal for the radiotherapy field and its patients. Radiation therapists need to come together in unity to suggest guidelines applicable to them as they continue service delivery during the containment pandemic era. In the absence of these tools, Radiotherapy departments are prone to experiencing a high sense of uncertainty in preparation for the readiness of the next pandemic wave. Therefore, by developing guidelines aimed at continuing work and the safety of radiation therapists, service delivery within this department will continue. Managers should also have suggested standard approaches to pandemics to help them to guide the employed radiation therapists in public oncology hospitals to steer the departments forward, irrespective of the ever-changing pandemic waves. This will ensure continuous service delivery in the cancer community.

6.2.4 Support needed

The public oncology hospitals' management can assist to support radiotherapy departments in curbing the spread of COVID-19 and ultimately improve staff morale by encouraging them to continue service delivery. Part of the support can include frequent virtual workshops on how radiotherapy departments can work under stressful pandemic conditions. Managers of Radiotherapy departments can also be allowed to request sufficient PPE to adhere to hygienic protocols for infection control. The onus is on both the department management and the hospital management to raise this lack of support to the government in order to ensure that priority is also given to radiation therapists to ensure continuous service delivery as the pandemic waves come and go.

6.3 STUDY LIMITATIONS

Ross and Bibler (2019: 261) clarified that study limitations represent weaknesses within a research design that may influence the outcomes and

conclusions of the research. These need to be outlined as they occur in different stages of the research as follows:

- Some study limitations of this research were introduced during the data collection phase. The researcher employed a purposive sampling method to collect data, and with this self-selection method, participants were of different personalities. Some were overly outspoken and gave detailed description, while others were brief and gave limited responses even when probed.

- Additionally, biased responses are often a frequent limitation in qualitative research, whereby the study participants respond in a manner that is acceptable to the researcher and the public. Popovic and Huecker (2021: np) proclaimed that in academic research, bias refers to a type of systematic error that can distort measurements and/or affect investigations and their results. Participants in such studies often withhold information. It may have been possible that a small fraction of the participants withheld information in fear of exposing the departments' shortfalls during the pandemic era. The study participants were from two public oncology hospitals in the KZN region. Participants had to be qualified radiation therapists currently employed post their community service year. Fundamental data was obtained from interviewed participants. Extreme attentiveness was mandatory during the data transcription as well as the data analysis processes.

- In addition to the aforementioned, the researcher noted that methodology limitations such as a limited sample size of 10 and the data collection tool may have been concretely linked. There was resistance to participation by radiation therapists due to the method of data collection, that being- audio recorded interviews. Participants often tend to avoid active participation in research studies and prefer

questionnaire-based data collection. This was one of the limitations the researcher experienced.

6.4 RECOMMENDAIONS

The departments may have invested heavily in the status quo; subsequently struggling to instil change brought forth by the COVID pandemic. Thus, recommendations supported by the study hope to avoid uncertain future disruptions of service delivery in oncology organizations. These are necessary actions to be taken to motivate radiation therapists and increase their morale**.** This study was conducted in KZN, one of the nine provinces in South Africa, and the recommendations are as follows:

- The Department of Health can introduce managerial training methods in order to train public oncology hospitals' radiotherapy department managers to continue facilitating uninterrupted optimal service delivery through the variant phases of the COVID-19 pandemic.
- In order to ensure the validity of the study findings, similar research can be conducted in other provinces of the country.
- Oncology patients can be interviewed in order to have a wholistic perspective of their experiences of clinical service delivery during the pandemic era.
- Government public oncology hospitals need to offer free psychosocial support to employees during pandemic eras in order to alleviate stress, anxiety, and to help them cope in order to continue providing optimal cancer care.
- Both employees and patients need to have access to educational opportunities in order to remain knowledgeable about the organizational status quo in relation to COVID-19.
- Remote treatment planning can be a new norm to decrease the number of radiation therapists in the workplace, as well as a preventative measure for them to not get infected, and to increase productivity by creating more treatment plans to continue service delivery.
- Routine screening of radiation therapists to minimize the risk of infectious disease transmission is advised.

6.5 CONCLUSION

In exploring radiation therapists' lived experiences of disruptions in radiotherapy service delivery in a developing country such as South Africa, there can be strategies that aid in supporting radiation therapists to continue providing clinical service delivery. This chapter provided the conclusion of the study, its limitations, and recommendations for future research.

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APPENDICES

Appendix 1: University Ethics Clearance

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

14 June 2023

Ms L Tshoke
8579 Motlathomo Crescent
Paradise Park
Vosloorus
1475

Dear Ms Tshoke

Radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province
Ethical Clearance number IREC 288/22

The DUT-Institutional Research Ethics Committee acknowledges receipt of your gatekeeper permission letters.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the DUT-IREC according to the DUT-IREC Standard Operating Procedures (SOP's).

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

It is compulsory for a student or researcher to apply for recertification on an annual basis. The failure to do so will result in withdrawal of ethics clearance. It is the responsibility of the researcher and the supervisor to apply for recertification.

Please note that you are required to submit a Notification of Completion of Study form together with an abstract to the DUT-IREC office on completion of your study.

Yours Sincerely

Prof J K Adam
Chairperson: DUT-IREC

Appendix 2a: Permission letter to the KZN Department of Heath

8579 Motlathomo crescent
Paradise park
Vosloorus
1475

Health Research and Knowledge Management
330 Langalibalele street
Private Bag X951
Pietermaritzburg
3201

Dear Gatekeeper

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a Master of Health Sciences degree (MSc) in radiography student at the Durban University of Technology. My research topic is: **Radiation therapists' experiences of clinical service delivery during the COVID-19 pandemic at public oncology hospitals in the KwaZulu-Natal province, South Africa.**

I hereby seek your permission to venture into the clinical settings to conduct semi-structured interviews with radiation therapists in the oncology departments of two public hospitals in KwaZulu-Natal (KZN)- Addington hospital (ADH) and Greys hospital.

I have provided you with a copy of the proposal summary of the study, which includes copies of the data collection tools, consent, and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC) and Department of Radiography.

If you require any further information, please do not hesitate to contact me telephonically on 0646154524 or via email on Lesegotshoke@gmail.com, or my supervisor Dr PB Nkosi on paulinen1@dut.ac.za. Thank you for your time and consideration on this matter.

Yours sincerely,

_____

Lesego Tshoke
Master of Health Sciences degree student at DUT
e-mail: Lesegotshoke@gmail.com
Cell: 0646154524

Appendix 2b: Permission letter from the KZN Department of Health

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:
Health Research & Knowledge Management

Physical Address: 330 Langalibalele Street, Pietermaritzburg
Postal Address: Private Bag X9051
Tel: 033 395 2805/ 3189/ 3123 Fax: 033 394 3782
Email:

NHRD Ref: KZ_202305_039

Dear Ms L. Tshoke
(DUT)

Approval of research

1. The research proposal titled **'Radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province'** was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **approved** for research to be undertaken at Addington and Grey's Hospital.

2. You are requested to take note of the following:
   a. ***Kindly liaise with the facility manager BEFORE your research begins.***
      This is to ensure that conditions in the facility are conducive to the conduct of your research. These include, but are not limited to, an assurance that the numbers of patients attending the facility are sufficient to support your sample size requirements, and that the space and physical infrastructure of the facility can accommodate the research team and any additional equipment required for the research.
   b. *All research conducted in KwaZulu-Natal must comply with government regulations relating to Covid-19. These include but are not limited to: regulations concerning social distancing, the wearing of personal protective equipment, and limitations on meetings and social gatherings.*
   c. *Please ensure that you provide your letter of ethics re-certification to this unit, when the current approval expires.*
   d. *Provide an interim progress report and final report (electronic and hard copies) when your research is complete to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za*
   e. *Please note that the Department of Health shall not be held liable for any injury that occurs as a result of this study.*

For any additional information please contact Mr. X Xaba on 033-395 2805.

Yours Sincerely

Dr E Lutge
Chairperson, Provincial Health Research Committee
Date: 12/06/2023

Appendix 3a: Permission letter to the eThekwini Health District

8579 Motlathomo crescent
Paradise park
Vosloorus
1475

eThekwini District Offices
83 Jan Smuts Mayville
P/Bag X54318
Durban
4000

Dear Manager

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a Master of Health Sciences degree (MSc) in radiography student at the Durban University of Technology. My research topic is: **Radiation therapists' experiences of clinical service delivery during the COVID-19 pandemic at public oncology hospitals in the KwaZulu-Natal province, South Africa.**

I hereby seek your permission to venture into the clinical setting to conduct semi-structured interviews with radiation therapists in the oncology department of one of the public hospitals in KwaZulu-Natal (KZN), Durban- Addington hospital (ADH).

I have provided you with a copy of the proposal summary of the study, which includes copies of the data collection tools, consent, and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC) and Department of Radiography.

If you require any further information, please do not hesitate to contact me telephonically on 0646154524 or via email on Lesegotshoke@gmail.com, or my supervisor Dr PB Nkosi on paulinen1@dut.ac.za. Thank you for your time and consideration on this matter.

Yours sincerely,

Lesego Tshoke
Master of Health Sciences degree student at DUT
e-mail: Lesegotshoke@gmail.com
Cell: 0646154524

Appendix 3b: Permission letter from the eThekwini Health District

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwin 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

14 June 2023

Ms L Tshoke
8579 Motlathomo Crescent
Paradise Park
Vosloorus
1475

Dear Ms Tshoke

Radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province
Ethical Clearance number IREC 288/22

The DUT-Institutional Research Ethics Committee acknowledges receipt of your gatekeeper permission letters.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the DUT-IREC according to the DUT-IREC Standard Operating Procedures (SOP's).

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

It is compulsory for a student or researcher to apply for recertification on an annual basis. The failure to do so will result in withdrawal of ethics clearance. It is the responsibility of the researcher and the supervisor to apply for recertification.

Please note that you are required to submit a Notification of Completion of Study form together with an abstract to the DUT-IREC office on completion of your study.

Yours Sincerely

_____
Prof J K Adam
Chairperson: DUT-IREC

Appendix 4a: Permission letter to the uMgungundlovu Health District

8579 Motlathomo crescent
Paradise park
Vosloorus
1475

UMgungundlovu District Offices
117 Hoosen Hffajee street
P/Bag X54318
Pietermaritzburg
3201

Dear manager

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a Master of Health Sciences degree (MSc) in radiography student at the Durban University of Technology. My research topic is: **Radiation therapists' experiences of clinical service delivery during the COVID-19 pandemic at public oncology hospitals in the KwaZulu-Natal province, South Africa.**

I hereby seek your permission to venture into the clinical setting to conduct semi-structured interviews with radiation therapists in the oncology department of one of the public hospitals in KwaZulu-Natal (KZN)- Greys hospital.

I have provided you with a copy of the proposal summary of the study, which includes copies of the data collection tools, consent, and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC) and Department of Radiography.

If you require any further information, please do not hesitate to contact me telephonically on 0646154524 or via email on Lesegotshoke@gmail.com, or my supervisor Dr PB Nkosi on paulinen1@dut.ac.za. Thank you for your time and consideration on this matter.

Yours sincerely,

Lesego Tshoke
Master of Health Sciences degree student at DUT
e-mail: Lesegotshoke@gmail.com
Cell: 0646154524

Appendix 4b: Permission letter from the uMgungundlovu Health District

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:
DISTRICT DIRECTOR

Private Bag X9124, PIETERMARITZBURG, 3200
Physical Address :171Hoosan Haffejee, Pietermaritzburg 3219
Tel: 033 8971002 Fax: 033 8971078 E-mail: Thyle.kunene@kznhealth.gov.za

Enquiries: Nokuthula Nzimande
11 APRIL 2022

TO: MS L TSHOKE
8579 MOTLATHOMO CRESCENT
PARADISE PARK
VOSLOORUS
1475

Dear Ms L Tshoke

RE: RADIATION THERAPISTS' EXPERIENCES OF RADIOTHERAPY SERVICE DELIVERY DURING THE COVID-19 PANDEMIC AT PUBLIC ONCOLOGY HOSPITALS IN KWAZULU-NATAL PROVINCE

I have pleasure in informing you that permission has been granted to you by UMgungundlovu Health District to conduct research on ***"Radiation therapists' experiences of radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province"***

PLEASE NOTE THE FOLLOWING

1. Please ensure that you adhere to all policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received the full ethics approval has been received and the confirmation from the Provincial Health Research Committee in the KZN Department.
3. Please ensure that this office is informed before you commence your research.
4. The District Office will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to the District Office.

Thank you,

DR M.T ZULU
DISTRICT DIRECTOR:
UMGUNGUNDLOVU HEALTH DISTRICT

Appendix 5a: Permission letter to the Addington Hospital CEO

8579 Motlathomo crescent
Paradise park
Vosloorus
1475

Radiation Oncology department
Addington hospital
16 Erskine Terrace
South Beach
Durban
4001

Dear Gatekeeper

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a Master of Health Sciences degree (MSc) in radiography student at the Durban University of Technology. My research topic is: **Radiation therapists' experiences of clinical service delivery during the COVID-19 pandemic at public oncology hospitals in the KwaZulu-Natal province, South Africa.**

I hereby seek your permission to venture into the clinical setting to conduct semi-structured interviews with radiation therapists in the oncology department of one of the public hospitals in KwaZulu-Natal (KZN)- Addington hospital (ADH).

I have provided you with a copy of the proposal summary of the study, which includes copies of the data collection tools, consent, and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC) and Department of Radiography.

If you require any further information, please do not hesitate to contact me telephonically on 0646154524 or via email on Lesegotshoke@gmail.com, or my supervisor PB Nkosi on paulinen1@dut.ac.za. Thank you for your time and consideration on this matter.

Yours sincerely,

Lesego Tshoke
Master of Health Sciences degree student at DUT
e-mail: Lesegotshoke@gmail.com
Cell: 0646154524

Appendix 5b: Permission letter from the Addington Hospital CEO

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

14 June 2023

Ms L Tshoke
8579 Motlathomo Crescent
Paradise Park
Vosloorus
1475

Dear Ms Tshoke

Radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province
Ethical Clearance number IREC 288/22

The DUT-Institutional Research Ethics Committee acknowledges receipt of your gatekeeper permission letters.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the DUT-IREC according to the DUT-IREC Standard Operating Procedures (SOP's).

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

It is compulsory for a student or researcher to apply for recertification on an annual basis. The failure to do so will result in withdrawal of ethics clearance. It is the responsibility of the researcher and the supervisor to apply for recertification.

Please note that you are required to submit a Notification of Completion of Study form together with an abstract to the DUT-IREC office on completion of your study.

Yours Sincerely

Prof J K Adam
Chairperson: DUT-IREC

Appendix 6a: Permission letter to the Greys Hospital CEO

8579 Motlathomo crescent
Paradise park
Vosloorus
1475

Health research and knowledge
Greys Hospital
The Msunduzi
Town Hill
Pietermaritzburg
3201

Dear Gatekeeper of the hospital

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a Master of Health Sciences degree (MSc) in radiography student at the Durban University of Technology. My research topic is: **Radiation therapists' experiences of clinical service delivery during the COVID-19 pandemic at public oncology hospitals in the KwaZulu-Natal province, South Africa.**

I hereby seek your permission to venture into the clinical setting to conduct semi-structured interviews with radiation therapists in the oncology department of one of the public hospitals in KwaZulu-Natal (KZN)- Greys hospital.

I have provided you with a copy of the proposal summary of the study, which includes copies of the data collection tools, consent, and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC) and Department of Radiography.

If you require any further information, please do not hesitate to contact me telephonically on 0646154524 or via email on Lesegotshoke@gmail.com, or my supervisor PB Nkosi on paulinen1@dut.ac.za. Thank you for your time and consideration on this matter.

Yours sincerely,

Lesego Tshoke
Master of Health Sciences degree student at DUT
e-mail: Lesegotshoke@gmail.com
Cell: 0646154524

Appendix 6b: Permission letter from the Greys Hospital CEO

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwin 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

14 June 2023

Ms L Tshoke
8579 Motlathomo Crescent
Paradise Park
Vosloorus
1475

Dear Ms Tshoke

Radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province
Ethical Clearance number IREC 288/22

The DUT-Institutional Research Ethics Committee acknowledges receipt of your gatekeeper permission letters.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the DUT-IREC according to the DUT-IREC Standard Operating Procedures (SOP's).

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Please note that you are required to submit a Notification of Completion of Study form together with an abstract to the DUT-IREC office on completion of your study.

Yours Sincerely

_____
Prof J K Adam
Chairperson: DUT-IREC

Appendix 7a: Permission letter to the Addington Hospital Radiotherapy Department Manager

8579 Motlathomo crescent
Paradise park
Vosloorus
1475

Radiation Oncology department
Addington hospital
16 Erskine Terrace
South Beach
Durban
4001

Dear Assistant Director of the Addington hospital (ADH) radiation oncology department

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a Master of Health Sciences degree (MSc) in radiography student at the Durban University of Technology. My research topic is: **Radiation therapists' experiences of clinical service delivery during the COVID-19 pandemic at public oncology hospitals in the KwaZulu-Natal province, South Africa.**

I hereby seek your permission to venture into the clinical setting to conduct semi-structured interviews with radiation therapists in the oncology department of one of the public hospitals in KwaZulu-Natal (KZN).

I have provided you with a copy of the proposal summary of the study, which includes copies of the data collection tools, consent, and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC) and Department of Radiography.

If you require any further information, please do not hesitate to contact me telephonically on 0646154524 or via email on Lesegotshoke@gmail.com, or my supervisor PB Nkosi on paulinen1@dut.ac.za. Thank you for your time and consideration on this matter.

Yours sincerely,

Lesego Tshoke
Master of Health Sciences degree student at DUT
e-mail: Lesegotshoke@gmail.com
Cell: 0646154524

Appendix 7b: Permission letter from the Addington Hospital Radiotherapy Department Manager

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:
ADDINGTON HOSPITAL ONCOLOGY

Addington Hospital, 16 Erskine Road, Durban,4001
Philane.mazibuko@kznhealth.gov.za
Tel: 031 327 2200/04 Fax: 031 327 2200

Dear Miss L. Tshoke

RE: Permission to conduct study at the Addington Oncology Radiotherapy Department

I have pleasure to inform you that permission has been granted to you by the Radiation Oncology Unit management to conduct your research on:

Radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province

Yours Sincerely

Mr Philane Mazibuko
Assistant Director: Radiotherapy
Addington Hospital
Radiation Oncology Department

Appendix 8a: Permission letter to the Greys Hospital Radiotherapy Department Manager

8579 Motlathomo crescent
Paradise park
Vosloorus
1475

Radiation Oncology department
Greys Hospital
The Msunduzi, Town Hill
Pietermaritzburg
3201

Dear assistant director of the Greys hospital radiation oncology department

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a Master of Health Sciences degree (MSc) in radiography student at the Durban University of Technology. My research topic is: **Radiation therapists' experiences of clinical service delivery during the COVID-19 pandemic at public oncology hospitals in the KwaZulu-Natal province, South Africa.**

I hereby seek your permission to venture into the clinical setting to conduct semi-structured interviews with radiation therapists in your oncology department as one of the public hospitals in KwaZulu-Natal (KZN).

I have provided you with a copy of the proposal summary of the study, which includes copies of the data collection tools, consent, and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC) and Department of Radiography.

If you require any further information, please do not hesitate to contact me telephonically on 0646154524 or via email on Lesegotshoke@gmail.com, or my supervisor PB Nkosi on paulinen1@dut.ac.za. Thank you for your time and consideration on this matter.

Yours sincerely,

Lesego Tshoke
Master of Health Sciences degree student at DUT
e-mail: Lesegotshoke@gmail.com
Cell: 0646154524

Appendix 8b: Permission letter from the Greys Hospital Radiotherapy Department Manager

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

14 June 2023

Ms L Tshoke
8579 Motlathomo Crescent
Paradise Park
Vosloorus
1475

Dear Ms Tshoke

Radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province
Ethical Clearance number IREC 288/22

The DUT-Institutional Research Ethics Committee acknowledges receipt of your gatekeeper permission letters.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the DUT-IREC according to the DUT-IREC Standard Operating Procedures (SOP's).

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

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Please note that you are required to submit a Notification of Completion of Study form together with an abstract to the DUT-IREC office on completion of your study.

Yours Sincerely

Prof J K Adam
Chairperson: DUT-IREC

Appendix 9: Letter of Information

LETTER OF INFORMATION

Title of the Research Study: Radiation therapists' experiences of radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province

Principal Investigator/s/researcher: Lesego Tshoke, BHSc in Radiotherapy

Co-Investigator/s/supervisor/s: Dr PB Nkosi, PhD: Health Sciences.

Brief Introduction and Purpose of the Study: The recently emerged contagious respiratory disease, coronavirus (COVID-19), has since spread globally resulting in a pandemic. The ongoing viral pandemic has severely affected the world's economically developed and developing countries' healthcare systems, including radiotherapy. As a result, there was a surge of clinical changes and radiation therapists were expected to continue working. The researcher conducting this study observed that the pandemic has since brought changes to the clinical settings and their service delivery, including radiation oncology. This study will focus on South Africa as a developing country. It is imperative to understand how radiation therapists in developing countries such as the aforementioned express their opinions on the continuous deliver of the radiotherapy services during COVID-19 with the view to discover the support they need to provide ongoing optimal radiotherapy clinical service delivery.

This study aims to explore and describe the radiation therapists' experiences of clinical service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal (KZN), South Africa. A qualitative study following a phenomenological approach will be employed along with a non-probability purposive sampling that selects five radiation therapists from the each of the two hospitals: Addington hospital (ADH) and Greys hospital. Face to face, one on one semi-structured interviews using open-ended questions will be used to collect data until data is saturated from the participants. Data will be analysed using the Colaizzi's method of data analysis to identify themes which will be presented as findings. Discussion, conclusions, and recommendations will be based on the findings of the study.

Greeting: Greetings. I hope you are well. My name is Lesego Tshoke, I am qualified radiation therapist currently conducting research for my Master of Health Sciences (MHSc) in Radiotherapy.

Invitation to the potential participant: I would like to invite you to participate in the research. The information is as follows:

What is Research: Research is a systematic search or inquiry for generalized new information. Research seeks out answers to understand a specific problem and can be conducted for several purposes, one of which being to understand a phenomenon, behaviour, or test a theory.

Outline of the Procedures: Should you agree to participate in this study, you will be required to sign a consent form and participate in an interview. The interview will take about 30-45 minutes. The interview consists of two sections: the first requests demographic information, and second comprises of questions relating to your experiences as a radiation therapist. It is important that you answer the questions as openly and honestly as possible. Your responses will form the basis of some of the questions which may be asked by the researcher. At the end of the interview, the signed consent page must be handed to the researcher. Should you wish to be informed of what your information contributed, and or / the results of this study, note that this will be provided at the end of the last interview.

There are no foreseeable risks or harm that can be imposed by the research study to you. Also, you will not incur any research related injury or adverse reaction in this study. Participation involves an interview where you will be asked to relate your experiences as a student, and no names of people or sensitive information will be required of you. Participation in the study is voluntary. Should you decide not to be in the study any more, you can withdraw at any time.

Risks or Discomforts to the Participants: The study conduct has no physical foreseeable risks or discomforts, however, should you feel emotionally drawn back to an incident related to COVID-19 that closely relates to the interview, you are allowed to take time aside to breathe and recollect thoughts with the reassurance of the researcher.

Reason/s why the Participant May Be Withdrawn from the Study: You are free to withdraw from the study at any time and there is no penalty that will be imposed on you.

Benefits: The findings of the study would contribute new knowledge with regards to the impact of COVID-19 on the radiotherapy service delivery exclusively in developing countries where there are constraint radiotherapy resources. The findings of the study will further contribute to new knowledge regarding the support for radiation therapists to adapt to COVID-19 changes and continue providing optimal service to cancer patients. Future research should be directed at using quantitative approach to profile the COVID-19 changes and the appropriate support needed in order to assist radiation therapists to adapt to changes and continue providing optimal radiotherapy services. The researcher will benefit by hopefully publishing in peer reviewed journals, and possibly present results at conferences.

Remuneration: You will not receive any remuneration of any kind for participation in this study.

Costs of the Study: You do not pay anything to participate in the study.

Confidentiality: All information and data will be kept strictly confidential. The interview guide will be coded; no names will be written on the guide. The list of names and corresponding research numbers will be stored on a password-protected computer. Only the supervisors will have access to

this data. Upon completion of the study, the research material will be kept for five years thereafter it will be deleted by the researcher.

Results: The researcher plans to disseminate the results of the research. Should any significant new findings developed during the course of the research, emails will be sent to the participants to update them of the study development.

Research-related Injury: The research will not require participants to perform any acts or make statements which might cause them discomfort or adverse reaction.

Storage of all electronic and hard copies including tape recordings: Data will be collected using notepads and audio recordings, which will be kept in an access-controlled computer where the password/s are only known to the researcher. This data will be stored for a maximum of five years

Persons to Contact in the Event of Any Problems or Queries: If you have any questions, concerns or problems at any time about the study or the procedures feel free to contact the researcher, Lesego Tshoke at 0646154524 or via email at Lesegotshoke@gmail.com or my supervisor Dr. P.B. Nkosi may be reached at 031 373 2509; or the Institutional Research Ethics Administrator on 031-373 2375. Complaints can be reported to the Acting Director: Research and Postgraduate Support on researchdirector@dut.ac.za

Appendix 10: Informed Consent form

Full Title of the Study: Radiation therapists' experiences of radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in KwaZulu-Natal province

Names of Researcher/s: Lesego Tshoke, BHSc in Radiotherapy

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Lesego Tshoke, 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 regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, Lesego Tshoke 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**

Appendix 11: Interview guide

Interview guide

Introduction:

- Self-introduction and welcome participant.
- Inform participant about the use of audio recording device during the discussion.
- Participant is informed about confidentiality and anonymity during the interview and that their names will not be reflected in the transcribed text.
- Consent forms discussed and signed by participants.
- Participant is reminded of their free will to participate or terminate the interview at any point without repercussion.

SECTION 1: DEMOGRAPHIC DATA

PLEASE TICK THE APPROPRIATE BOX

1. GENDER

Male	
Female	
Other	

2. ETHNICITY

African	
Asian	
Coloured	
White	
Other	

3. AGE IN YEARS

21 - 30	
31 - 40	
41 - 50	
51 - 60	
Above 60	

4. MARITAL STATUS

Single	
Married	
Divorced	
Widow	
Widowed	

5. WORK EXPERIENCE IN YEARS

1 - 10	
11 - 20	
21 - 30	
31 - 40	
Above 40	

6. RANKING

Junior	
Senior	
Chief	
Manager	
Deputy Director	

7. WORK STATION

Simulation	
Planning	
Treatment	
Leadership	

Section 2: Interview Session

Session starts:

Good day, welcome to the interview. Thank you for your time and agreeing to participate in this study. In this interview, we shall discuss issues pertaining to your experiences as a radiation therapist in a government hospital during the COVID-19 pandemic. The information obtained will be used for research purposes only.

There are no right or wrong answers to the questions. Feel free to express yourself as you feel comfortable.

No names will be written in the research transcripts as well as report. You are assured of complete **confidentiality.**

I would like to inform you once again that this interview is being audio recorded, and your participation is voluntary. We may stop at any point if you wish to discontinue.

Grand Tour Question:

How did it feel delivering radiotherapy service during the COVID-19 pandemic?

Probing questions will be based on the responses by participants

1. What were the changes in the hospital setting that affected your service delivery?

2. What were the changes in the radiotherapy service delivery?

3. What were the changes in your work station as a result of changes in the radiotherapy service delivery? How did you cope? What support did you require to cope? What support did you get?

4. What were the changes in your wellbeing due to the changes in the radiotherapy service delivery? How did you cope? What support did you require to cope? What support did you get?

5. What were the changes in your working conditions due to changes in the radiotherapy service delivery during COVID-19 pandemic? How did you cope? What support did you require to cope? What support did you get?

6. What improvements in the support did you require as the pandemic continued?

Closing the interview:

1. Is there anything else that you would like to add that you think may help me get a clearer picture of your experiences whether individually or within the multidisciplinary during this era?

2. Thank the participant once more for their time and end the interview session.

Appendix 12: Sample of the Interview Transcript

Sample of participant 003 interview transcript

Interview 3

Gender: Female

Ethnicity: Black

Age in years: 41-50

Marital status: Widowed

Work experience in years: 11-20

Ranking: Assistant Director (AD)

Work station: Leadership

Interviewer: Good day. My name is Lesego Tshoke. Welcome to the interview. Thank you for your time and agreeing to participate in the study. In this interview, we'll discuss issues pertaining to your experiences as the AD of the radiation therapy department during the COVID 19 pandemic. Any information obtained here will be used for research purposes only. Okay, so remember that there are no right or wrong answers, so feel free to express yourself as comfortably as possible. No names will be written in the research transcripts as well as the report, so you are assured complete confidentiality, even though you did give your name on the consent form. I would also like to inform you once again that this interview is being audio recorded and that your participation is completely voluntary. So, we may stop at any point should you wish to discontinue. Okay?

Interviewer: How did it feel delivering radiotherapy service during the COVID 19 pandemic?

Participant 003: Initially, it was scary and stressful. It was like stepping into a new world where people had to be on high alert with minimal information, particularly in the radiotherapy space. As the radiotherapy department, we did not have direct guidelines on how to continue our work and still feel safe. That created a lot of anxiety because we worried a lot about taking the virus back home to our loved ones.

Interviewer: What were the changes in the hospital setting that affected your service delivery?

Participant 003: Our hospital had a complete shut down as soon as the pandemic hit. No one knew what to do to protect both patients and staff so closing the hospital momentarily in order to figure that out and receive a memorandum that would guide us all was the aim. From the hospital shutting down, there were new processes of triaging patients and only emergent cases were allowed into the hospital. No new referral patients could come into the oncology departments unless they were emergencies.

Interviewer: What were the changes in the radiotherapy service delivery?

Participant 003: A lot of our patients stayed at home, not only in fear of contracting the virus, but because it was difficult to enter the hospital unless they were deemed an emergency case. This delayed the patients from commencing their treatment and those that were already on treatment were delayed by the hospital closure and ended up needing treatment alterations in order to successfully complete their radiation treatment. Radiation therapists in our department also had to spread themselves thin to continue service delivery and because of the lack of resources, especially PPE, this was difficult. Staff on the floor did not have enough PPE such as gloves, masks, or even gowns to change into to minimize the viral spread while treating patients that are just as risk as any other. And as a manager, it was very difficult for me to request for more PPE from the other authorities because we were not deemed as high risk frontliners. For example, healthcare workers who were working directly with COVID positive patients were the ones who were prioritized and then the rest of other existing

departments would have to have the rest of the supply almost evenly distributed amongst them. This affected us from continuing delivering services as we did not feel safe or protected.

Interviewer: What were the changes in your work station as a result of changes in the radiotherapy service delivery? How did you cope? What support did you require to cope? What support did you get?

Participant 003: Well as a manager, I had to be the go-between person. I had to make sure that despite the pandemic, my team continued to work while feeling protected by me and that my superiors realize the work put in from our department. This was difficult because staff gradually caught the virus and had to quarantine until their symptoms resolved, and this left us skeleton staffed. So, we basically could not cope that well as a department. We needed higher management to provide us with more PPE supply to prevent the very staff from contracting the virus and possibly spreading it amongst each other. We needed to be taken as seriously as other frontline workers, especially because we work with immunocompromised patients that might fall off their prognosis if their treatment is disrupted the way it was. We did not get any of this.

I**nterviewer:** What were the changes in your wellbeing due to the changes in the radiotherapy service delivery? How did you cope? What support did you require to cope? What support did you get?

Participant 003: COVID caused everyone a lot of anxiety and stress, and I was no different. I was frustrated most of the time because no matter how much I tried to steer the ship forward, there would always be a block. Having to fight for cancer patients to be given just as much attention as the COVID infected patients was frustrating because infection control was more concerned about giving COVID patients medical attention and almost neglected the oncology patients who needed more protection as they continued with their treatment.

I am still learning to cope with the trauma COVID brought. As managers, we are often expected to deal with medical emergencies in an objective manner and that affects us because we are still human and we were always trained to have empathy. With regards to the support we needed to cope, I feel there will always be new pandemics and unfortunately, we need to empathize with our patients through them all. I feel we need to be given some form of standard approach to pandemics as managers so that we are able to lead our teams confidently when the time comes.

Although we did get constant reassurance and gazettes were sent to us each time there was a new COVID update, we still have concerns as managers.

Interviewer: What were the changes in your working conditions due to changes in the radiotherapy service delivery during COVID-19 pandemic? How did you cope? What support did you require to cope? What support did you get?

Participant 003: It was such a depressing time for us as healthcare workers to exist in. In my case, I feel my staff needed me to be there to provide answers, some of which I never had myself. Although I did my best, I could not take away every staff member's anxiety nor fear to be at work during that difficult time. So, we obviously had to deviate from our normal working conditions and included changes such as working shifts so that the number of staff members in each unit can adhere to social distancing standards. We had to implement regular cleaning of surfaces, especially after each patient's treatment to ensure that there is no cross contamination.

I found this time very stressful as I had to ensure that my department continues to run smoothly with patients receiving their prescribed treatment, and make sure that radiation therapists on duty feel are led with proper guidance. However, radiation therapists did not seem to cope that well under these new conditions because it strained each team to deal with the number of patients that is meant to be dealt with by double the staff members. I also found it mentally draining for us all.

In context to the current COVID state, we needed to at least be awarded appropriate guidance and PPE that allows us to continue providing a safe radiotherapy service by limiting potential viral exposure to patients and radiation therapists on duty.

Interviewer: What improvements in the support did you require as the pandemic continued?

Participant 003: It would have been nice to have standard formulated protocols that were reviewed by the infection control team that somewhat protect the radiation therapy staff and its patients in order for us to continue to have a smooth workflow. I think also having meetings or virtual workshops that would have taught radiation therapists strategies to safely work while under stress without jeopardizing patients would have been a great help.

Interviewer: Is there anything else that you would like to add that you think maybe you might help me get a clearer picture of your experiences whether individually or within this multidisciplinary team?

Participant 003: COVID is not entirely gone and yet people treat it as though it is. So as an individual and a manager for a department that serves highly sensitive patients, I would like for us to continue using PPE and adhering to the hygiene protocols that were set during the peak of COVID. I would also just like for the hospital management to be more open to our suggestions as departmental managers rather than authoritative, where they tell us what to do instead of listening to what we want to do in our respective departments to protect us through these pandemics that come and go.

Interviewer: Thank you so much for your time and taking time aside to participate. Have a lovely day. Thank you.

Appendix 13: Letter from the professional editor

EDITOR'S LETTER

Researchers Beyond-Borders (PTY) LTD
Umhlanga, Durban
South Africa
20 November 2023

To whom it may concern

Editing of Masters Dissertation: Lesego Tshoke (Student number - 21355487)

Title: Radiation therapists' experiences of disruptions in radiotherapy service delivery during the COVID-19 pandemic at public oncology hospitals in Kwazulu-Natal, South Africa

This letter serves as confirmation that the aforementioned dissertation has been language edited. Any queries may be directed to the author of this letter.

Regards

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