Experiences of Diagnostic Radiography Middle Managers working at a Private Radiology Practice during the COVID-19 pandemic

By

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DECLARATION

I, **Yolanda Le Roux-Arries**, declare that the contents of this thesis represent my own unaided work and that the thesis has not previously been submitted for academic examination towards any qualification.

Furthermore, it represents my own opinions, not necessarily those of the Cape Peninsula University of Technology. The Grammarly Artificial Intelligence tool was utilised to ensure language quality and enhance grammar.

Signed: 

Date: 18 October 2025

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ABSTRACT

Introduction: The COVID-19 pandemic affected hospitals, including diagnostic radiology departments all over the world. Operational management of radiography services in diagnostic radiology departments had to be adjusted to ensure the safe delivery of services to patients and to protect employees. Diagnostic radiography middle managers are responsible for the strategic planning and implementation of radiography services, providing leadership and collaborating with multidisciplinary teams to ensure that services align with the goals and objectives of the organisation. After the World Health Organisation declared the onset of the COVID-19 pandemic in March 2020, the diagnostic radiography department in this study, like other imaging departments in hospitals, had to adapt to the new public health guidelines and service delivery protocols.

Aim: This study aimed to explore and describe the experiences of diagnostic radiography middle managers working at a private radiology practice during the COVID-19 pandemic.

Methods: This research employed an exploratory, descriptive qualitative study using a case study. Semi-structured interviews with diagnostic radiography middle managers working at various branches of a private radiology practice were conducted using the Zoom Communications Inc. online platform. Permission from the managing committee of the radiology practice was sought and obtained before data collection began. Participants voluntarily consented to participate. Additionally, ethical principles such as confidentiality and anonymity were maintained. Data was analysed using thematic analysis, with data being managed in compliance with the University's established data management protocols.

Results: Three main themes were developed namely adapting to change, challenging environment and managerial growth amidst the pandemic. Diagnostic radiography middle managers initially felt overwhelmed by the added responsibilities placed upon them at the onset of the COVID-19 pandemic. They also experienced psychological

challenges dealing with their own fears as well as those of staff members. However, as the pandemic progressed, they adapted effectively, rising to the challenges with confidence and professionalism.

Conclusion: Diagnostic radiography middle managers experienced many work-related challenges, particularly in managing operational demands during the COVID-19 pandemic. Aspects highlighted by the diagnostic radiography middle managers were learning from one another through partnership to find innovative solutions. They reflected on key lessons learnt, like relying on support structures available to them as well as having a readiness to adapt swiftly to change. The study emphasises the need for a crisis management manual to guide diagnostic radiography middle managers in the event of possible future infectious disease outbreaks. An employee health and wellness programme could also be implemented to support radiology staff members during public health crisis periods.

Keywords: Diagnostic radiography, middle managers, COVID-19 pandemic, experiences of managers, private radiology practice

ABBREVIATIONS AND ACRONYMS

COVID-19	Coronavirus disease 2019
CPUT	Cape Peninsula University of Technology
CT	Computed Tomography
CXR	Chest X-ray
DRMMs	Diagnostic radiography middle managers
HMMs	Healthcare middle managers
HOD	Head of Department
HPCSA	Health Professions Council of South Africa
IPC	Infection prevention and control
MRI	Magnetic Resonance Imaging
PCR	Polymerase chain reaction
POPIA	Protection of Personal Information Act
PPE	Personal protective equipment
SA	South Africa
WHO	World Health Organisation

Definitions of concepts used in the context of the study

Middle Managers:

Definition: Middle managers are employees who supervise frontline employees, are supervised by an organisation's top managers and are in a unique position to promote the implementation of evidence-based practices in healthcare organisations (Birken et al., 2018: 2).

Definition: Managers who play a major role in maintaining good morale, controlling the employees and promoting productivity (Rajan, 2018: 145). To get subordinates to perform their duties, managers should have skills such as communication, decision-making, criticism tolerance, forecasting, adaptability, adjustability, cooperation and egolessness. (Rajan, 2018: 145)

Diagnostic Radiography Middle Manager: In the study context, a diagnostic radiography middle manager is an employee of a radiology practice who supervise frontline radiography staff members and are responsible for the general management of the imaging branch. This position is also referred to or known as a Head of Department (HoD).

General management tasks would include the:

- management and supervision of staff members during daily operational tasks.
- evaluation of radiology quality indicators and clinical outcomes.
- facilitation of professional staff development and coordination of the radiology activities within the department.
- management of safe equipment usage, as well as policy and compliance administration (Radiology Practice Job Description, 2019)

Experiences: As explained by Paulsen (2020: 863), experiences are recognised in human consciousness as conceptions of objects and events in the real or the imaginary world. Paulsen (2020:862) states that people often perceive an experience as a feeling and a way of thinking related to an event, issue, lack of skill, understanding, or available actions.

During the semi-structured interviews, the experiences were articulated by the diagnostic radiography middle managers reflecting on their experiences during the COVID-19 pandemic.

Guidelines: Kredo et al. (2016:123) described guidelines as a convenient way of packaging evidence and presenting recommendations to healthcare decision makers. The authors elucidated that guidelines have a range of purposes, intended to improve effectiveness and quality of care, to decrease variations in clinical practice and to decrease costly and preventable mistakes and adverse events.

Clinical guidelines: As defined by Kredo et al. (2016: 122), clinical guidelines are statements that include recommendations intended to optimise patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options.

Private radiology practice: A radiology practice that is privately owned by radiologists and operates within various private hospitals.

Private radiology practice branch: This is a unit within a private hospital where radiologists and radiographers provide diagnostic imaging services as part of a larger privately owned radiology group.

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CHAPTER 1

OVERVIEW OF THE RESEARCH STUDY

1.1 Introduction

In December 2019, an outbreak of a mysterious pneumonia characterised by fever, dry cough, fatigue, and occasional gastrointestinal symptoms emerged in Wuhan, China (Wu et al., 2020: 217). The outbreak of these mysterious respiratory infections had possible links to the Huanan Seafood Wholesale Market (Jorge & Fridell, 2021: 377). By 6 February 2020, a total of 28,276 confirmed outbreak cases of the mysterious pneumonia amongst humans had been recorded, with 565 deaths documented by the World Health Organisation (WHO), affecting at least 25 countries (Wu et al., 2020: 217). Wu et al. (2020: 217) further explained that the pathogen responsible for the outbreak was later identified as a novel beta-coronavirus, named 2019 novel coronavirus (2019-nCoV). On 11 March 2020, the WHO declared the novel coronavirus (COVID-19) outbreak a global pandemic (Cucinotta & Vanelli, 2020: 157).

Many countries around the world implemented national lockdown/ stay-at-home orders to minimise contact with potentially infected individuals (Hendrikse et al., 2020: 1113; Nematswerani et al., 2023: 1156). Ruiz et al. (2020: 414) stated that due to the rapid spread of the disease and the lack of vaccinations or effective treatment, health authorities in Spain took measures to prevent its transmission by restricting movement and interpersonal interactions. South Africa (SA) reported the country's first diagnosed COVID-19 patient on 5 March 2020. In an official televised national address to the nation on 23 March 2020, the President of SA announced the commencement of a 21-day national lockdown (Official Newspaper of the Parliament of RSA, in session. 2020:1). On 27 March 2020, SA started a lockdown, with 927 confirmed COVID-19 positive cases (Official Newspaper of the Parliament of RSA, in session. 2020:1;

Hendrikse et al., 2020: 1113). The lockdown was deemed necessary to reduce the transmission rate and allow healthcare facilities to prepare for an anticipated increase in infection rates and increased demand for medical services (Official Newspaper of the Parliament of RSA, in session. 2020:1).

The SA government had developed an approach where five coronavirus lockdown levels were identified, based on the infection rate patterns, which were implemented from March 2020 (Lewis & Mulla, 2020: 1). As stated in the government gazette of the South African Department of Health (2020:4), the levels were based on the following criteria:

- **Level 5:** Indicated the highest COVID-19 spread with a low-health system readiness.
- **Level 4:** Indicated a moderate to high COVID-19 spread with a low to moderate health system readiness.
- **Level 3:** Indicated a moderate COVID-19 spread with a moderate health system readiness.
- **Level 2:** Indicated a moderate COVID-19 spread with a high health system readiness.
- **Level 1:** Indicated a low COVID-19 spread with a high health system readiness.

The national lockdown had a direct impact on the operation of healthcare facilities in SA. Nematswerani et al. (2023: 1156) indicated that while only allowing essential services to continue during these lockdown measures, healthcare systems had to re-organise by pausing planned surgeries that were deemed non-urgent to create capacity for the management of COVID-19-infected patients.

Jorge and Fridell (2021: 378) explained that the presence of the virus in a person suspected of being infected was confirmed by undergoing a polymerase chain reaction (PCR) laboratory test. This test had to be conducted at medical facilities and testing laboratories. The authors, however, noted that this PCR test had a risk of false-negative results, which increased the potential exposure of health care professionals to undetected COVID-19 cases. Jorge and Fridell (2021: 377) further explained that

the spread of the coronavirus occurred mainly through close contact between infected humans via droplet infections like sneezing, coughing, speaking, or by contaminated hands touching the eyes and mucous membranes in the nose and mouth. Pant and Subedi (2020: 34) pointed out that the severe acute respiratory syndrome coronavirus 2, also described as SARS-CoV-2, affected the elderly and those with the presence of co-morbidities like hypertension, diabetes, and chronic obstructive pulmonary disease harshly, and they seemed to have an increased risk for the severity of COVID-19 disease. Pant and Subedi (2020: 34) further stated that those who have chronic kidney disease, cancer and those living in long-term care facilities have an increased risk of death if infected by the COVID-19 virus.

Diagnostic radiology departments provide essential imaging services of the human body and form part of the multidisciplinary teams in a medical facility. Imaging examination are performed by diagnostic radiographers and as stipulated by the Health Professions Council of South Africa (HPCSA), diagnostic radiographers are highly skilled professionals who integrate patient history, supporting clinical data and imaging protocols with the radiographic examination to obtain quality diagnostic results (Professional Board for Radiography and Clinical Technology - Scope of practice for Diagnostic Radiography, 2020: 2). This scope of practice stipulates that diagnostic radiographers must demonstrate a high degree of accuracy in the production of images, use of diagnostic technology, evaluation and analysis of diagnostic images for medicolegal requirements and technical quality (Professional Board for Radiography and Clinical Technology - Scope of practice for Diagnostic Radiography, 2020: 2).

As the coronavirus affected the lungs of infected individuals, radiographic chest X-rays (CXR) and Computed Tomography (CT) examinations played a crucial role in the diagnosis of SARS-CoV-2 (Aljondi et al., 2021: 52; Jorge & Fridell, 2021:378). Wu et al. (2020: 219) clarified that CXR and CT examinations usually revealed bilateral pneumonia (in 75–98% of cases) with multiple mottling and ground-glass opacity. The requests for CXR and CT examinations as diagnostic tools increased because these

imaging examinations became the preferred imaging in diagnosing COVID-19 pneumonia and as follow-up imaging of patients with respiratory complications due to COVID-19 infections (Akyurt, 2021: 1).

Lewis and Mulla (2020: 3) conducted a study to explore the experiences of diagnostic radiographers during the pandemic in Gauteng province in South Africa. Their study found that the radiographers experienced changes to work hours, implementation of stringent infection control measures, and faced mental and financial challenges. Healthcare middle managers (HMMs) working at a radiology practice in Northern Ireland also found themselves at the forefront of the COVID-19 pandemic, managing and coordinating radiography staff, imaging equipment and workflow to ensure an effective and efficient imaging service at their respective radiology branch of employment (McFadden et al., 2022: S73). These HMMs described how diagnostic and therapeutic radiography managers had to adapt to new working practices.

In SA, there are numerous non-government-funded, independently owned radiology practices operating in various private hospitals across the country. In their research, Lewis and Mulla (2020: 3) explained that the healthcare sector of SA consists of a public and a private sector with the government-funded public healthcare sector being under-resourced and supporting approximately 85% of the population, while the well-resourced private healthcare sector, catering for the remaining 15% of the population are paid through medical aid schemes and by individuals. The research study was therefore conducted to explore the experiences of the diagnostic radiography middle managers (DRMMs) working at the imaging branches of a private radiology practice in SA during the COVID-19 pandemic.

1.2 Background

Imaging services provided by the private diagnostic radiology practice that served as the research site include general X-rays, CT imaging, Magnetic Resonance Imaging (MRI), Ultrasound, Fluoroscopy, Mammography, Bone Mineral Density scanning,

Portable X-ray imaging, as well as fluoroscopic screening in the operating theatres of the hospitals. Most of these modalities require an appointment to be scheduled. Depending on the complexity of the imaging needed, the various modality appointments are generally booked at 30-minute intervals apart. Radiographers rotate through these modalities on a daily or weekly basis, performing routine imaging services from 8:00 in the morning to 17:00 in the afternoon, while also participating in after-hours services on a 24-hour basis.

As set out in the radiology practice job description of 2019, diagnostic radiography middle managers are responsible for overseeing the day-to-day operations of the department and play a crucial role in upholding the highest standards of patient care. They ensure the efficient delivery of services by ensuring radiographers produce high-quality diagnostic images and strategically rostering radiographers to enhance operational efficiency (Radiology Practice Job Description, 2019). During the COVID-19 pandemic, operational changes had to be implemented in the radiography department due to social distancing and infection control guidelines. DRMMs were also required to alternate radiographers' shift (duty) patterns so that fewer staff members were on a shift while still ensuring the continuous delivery of radiography services. At the study site, radiographers were divided into two groups, with one group being on duty while the other group were off duty. This resulted in services such as mammography, bone mineral density scanning, fluoroscopy and MRI examinations that were deemed non-urgent, to be suspended. DRMMs thus had to swiftly implement different shift rosters for radiographers while ensuring continuous service delivery of essential examinations and procedures. As the pandemic progressed, the various branches of the diagnostic radiology practice experienced an increase in the requests for chest X-rays and CT imaging of the chest due to their demonstrated value in assessing lung patterns in patients infected with the coronavirus.

Early findings from a study in China by Jorge and Fridell (2021: 378) showed the diagnostic value of CT in identifying respiratory disorders. The authors specifically noted CT examinations of the thorax as valuable in detecting the early and ongoing

spread of infection in the lungs of patients with the most common SARS-CoV-2 symptoms. The CT scans thus served as a valuable imaging tool in the management of patients with COVID-19 (Jorge & Fridell, 2021: 378). Akyurt (2021: 5) explained that given the vital role of radiographers serving as frontline professionals with close patient contact, their knowledge regarding the COVID-19 disease and protective measures against the spread of the coronavirus was critical. Moreover, Chinene (2023: 493) reported that radiographers had to adapt to new protocols and workflow operations to cope with the COVID-19 pandemic. It, therefore, became the responsibility of managers in radiology departments to ensure that radiographers receive appropriate training on managing infected patients while adhering to the newly implemented health and safety guidelines.

Akudjedu et al. (2020: 8) also described the need for a change in work patterns in the United Kingdom during the COVID-19 pandemic. As explained by Akudjedu et al. (2020: 8), this change was driven by the impact of the lockdown, which resulted in a decrease in the overall volumes of diagnostic imaging due to the need to adhere to public health guidelines of limiting the need for elective care. Akudjedu et al. (2020:8), however, indicated that the need for procedural volumes of CXR and CT scans of the thorax increased due to the valuable information these diagnostic imaging examinations provided about the progress of the disease within the lungs. Similarly, Hundah et al. (2024: 5) indicated that in KwaZulu-Natal, South Africa, there was an increased demand for particularly CT pulmonary angiogram scans and mobile chest imaging for patients during both active and post-COVID-19 phases. Akudjedu et al. (2020: 8) explained that to facilitate changes in work patterns during the coronavirus pandemic, managers in hospitals and radiography departments played an integral role in ensuring all aspects of operations management were adhered to, while Tay et al. (2020: 469) stressed that the need for leadership with the foresight to anticipate potential operational issues became crucial to managing operations in the face of the pandemic. Tay et al. (2020: 469) indicated the need for implementing a disease outbreak task force, daily meetings to review overnight incidents, and planning around the rapidly changing scenarios during the COVID-19 pandemic.

At the start of the pandemic, radiographers, who are considered frontline workers, were essential in producing high-quality images of suspected and confirmed COVID-19 patients (International Society of Radiographers and Radiological Technologists, 2020:2). Akyurt (2021: 5) highlighted that radiographers were also faced with problems of high workload and psychological pressure, which had a risk of psychological distress-mediated problems, including anxiety, depression, and burnout. Other healthcare workers such as nurses reported experiencing enormous psychological pressure and work-related stress, resulting from taking care of patients infected with COVID-19 and stress caused by an increase in patient numbers, infected with the coronavirus (Sehularo et al., 2021: 2). Foley et al. (2020: 7) reported that heightened anxiety, depression, insomnia, and burnout were amongst the symptoms of radiographers working in Ireland during the pandemic. Tariq et al. (2020: 131) stressed that COVID-19 was a new disease that affected millions of people throughout the world, leading to concerns about the mental and physical health of healthcare workers due to direct patient care. The findings in the study by Chinene (2023: 494) suggested that the participating radiographers were susceptible to various mental health consequences and highlighted the importance of developing and implementing specific strategies to alleviate the burden of mental health consequences.

From the researcher's experience, various new working requirements were implemented, and radiographers had to adapt to accommodate the latest health and safety regulations to work with highly infectious COVID-19 patients. This change in workflow had to be done while minimising the risk of cross-infection within the radiology department and the hospital. All radiographers had to swiftly familiarise themselves with the correct use of personal protective equipment (PPE) and infection control measures within the radiology department and all departments within the hospital environment. In addition to their daily duties, DRMMs had to put policies, plans, and protocols in place while at the same time ensuring the safety of patients, staff members, and the public.

Hartviksen et al. (2018:1) argue that HMMs, as leaders, are the closest to the everyday clinical practice in healthcare service delivery, and their role became even more important during the pandemic. HMMs had to implement the operational changes and enforce new clinical guidelines. As further explained by Hartviksen et al. (2018: 1), HMMs have a crucial role in translating top-level policies, strategies, and ways to achieve practical improvements in healthcare. Middle managers are considered the link between employees and top management, with Oldenhof (2015: 197) describing middle management as a place somewhere "in the middle" of the work floor and higher management. Furthermore, Rezvani (2017: 7) asserts that middle managers perform multiple roles in an organisation and are responsible for decisions within their authority. Rezvani (2017: 7) outlines the different roles performed by middle managers in an organisation as depicted in figure 1. (re-created from Rezvani, 2017: 5)

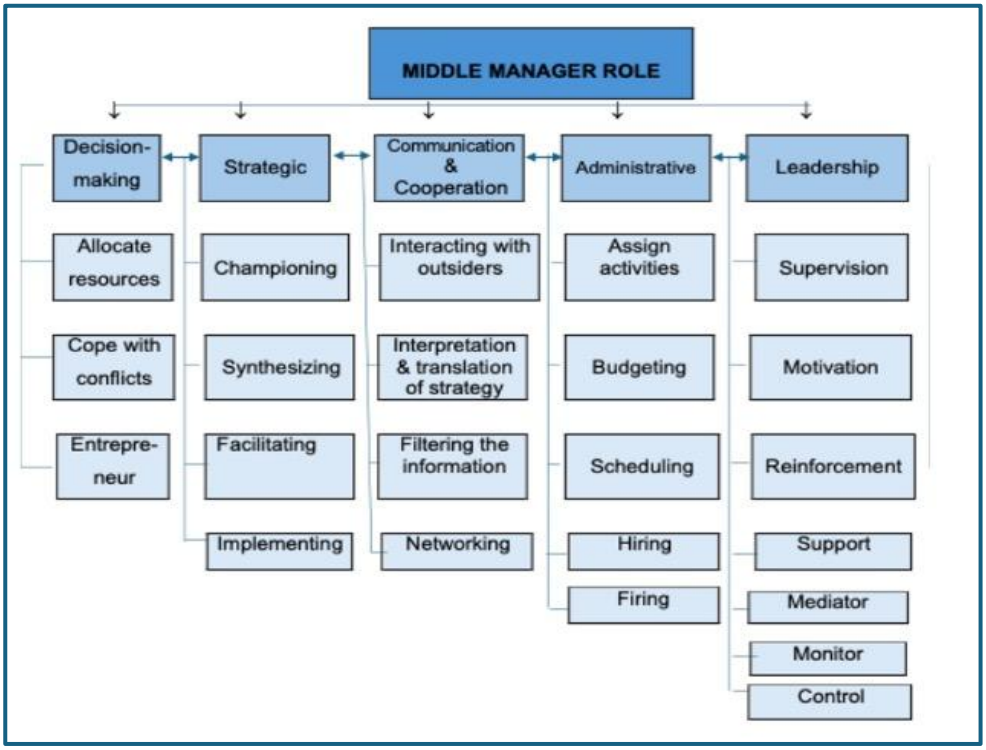

FIGURE 1: ROLE OF MIDDLE MANAGERS

The literature describes the experiences and challenges of radiographers working during the COVID-19 pandemic as being sad, terrified, confused, stressed, anxious and overwhelmed (Lewis & Mulla, 2020: 3). Similarly, the researcher of the current

study, through observation and anecdotal evidence, noted stress and anxiety among DRMMs. Furthermore, the increased workload and increased responsibility placed on DRMMs during the COVID-19 pandemic, are believed to have given rise to unique experiences and challenges; a belief that inspired this research study.

1.3 Problem Statement

Most of the available literature reports on the effects of the COVID-19 pandemic on nurse practitioners and general radiographers (Blake et al., 2020; Ogolodom et al., 2020; Tariq et al., 2020; Aljondi et al., 2021; Jorge et al., 2021; Lewis & Mulla, 2021; Ruiz et al., 2021; Sehularo et al., 2021; Williams et al., 2021; Zervides et al., 2021; Naylor et al., 2022; Chinene, 2023; Hundah et al. 2024). After searching various databases such as Science Direct, Scopus, PubMed, Google Scholar, SpringerLink and Elsevier, during May 2021 and April 2024, the researcher could not find any evidence that related to the experiences of DRMMs during the COVID-19 pandemic. During the database search, various keywords and keyword combinations were used, which included but were not limited to radiography management during COVID-19, diagnostic radiography managers, management in radiology, COVID-19 in radiology, radiography middle managers, radiography manager experiences during COVID-19 and the role of radiography manager.

However, the researcher found two studies, both conducted in Northern Ireland, which included some focus on radiography service managers' experiences during COVID-19. The study by McFadden et al. (2022:S68) explored the experiences of radiography managers and staff members in both diagnostic radiography and radiotherapy departments, while the study by Flood et al. (2022: S28) explored the perspectives of the radiography managers about the impact of COVID-19 on the mental health of radiography staff and managers. The study participants consisted of 12 managers, of which eight were diagnostic radiography service managers, one paediatric superintendent diagnostic radiographer, two therapeutic radiography service managers and one superintendent therapeutic radiographer. It is believed that the radiography service managers in the studies by McFadden et al. (2022) and Flood et

al. (2022) fulfilled the same role as a DRMM in the context of the current study. The researcher could not find studies solely conducted on the perspectives and experiences of DRMMs during the COVID-19 pandemic. The researcher, therefore, found a gap in the literature and aimed to explore and describe the experiences of DRMMs working at various branches of a particular private radiology practice during the COVID-19 pandemic.

1.4 Research Question

What were the experiences of diagnostic radiography middle managers (DRMMs) working at a private radiology practice within South Africa during the COVID-19 pandemic?

1.5 Aim and Objectives

The study aimed to explore and describe the experiences of DRMMs working at a private radiology practice in South Africa during the COVID-19 pandemic to develop guidelines to better support diagnostic radiography middle managers during future or similar pandemics.

The research objectives related to the study were as follows:

- To explore and describe the experiences of diagnostic radiography middle managers during the COVID-19 pandemic.
- To describe the operations management factors that diagnostic radiography middle managers faced while working at the private radiology practice during the COVID-19 pandemic.
- To describe new skills and abilities that diagnostic radiography middle managers acquired during the COVID-19 pandemic.
- To develop guidelines to better support diagnostic radiography middle managers during future or similar pandemics.

1.6 Overview of Research Methodology

An exploratory, descriptive, qualitative study was conducted. The study was conducted in the form of a case study, as only one radiology practice was included in the study. A case study, as described by Akhtar (2016: 75), aims to identify the exact factors and causes which reveal the behavioural patterns of a unit and the place of the unit in its surrounding social environment. The researcher conducted online semi-structured interviews with DRMMs and interpreted the responses of the participants to describe their experiences during the COVID-19 pandemic. An inductive research approach was followed. In the inductive research method, as described by Kim (2021: 151), the researcher initiates the study by systematically collecting data related to the research topic.

1.6.1 Research Participants and Sampling

The study population consisted of DRMMs working at a private radiology practice that operates at hospitals in the Western Cape and KwaZulu-Natal in South Africa. Purposive sampling was used as a specific group of individuals was required to answer the research question to meet the study objectives. Taherdoost (2016: 23) describes proposal or judgmental sampling as a strategy in which settings, persons or events are selected deliberately to provide important information that cannot be obtained from other choices. The DRMMs working at the private radiology practice during the COVID-19 pandemic were, therefore, the most suitable persons to participate in this study to answer the research question.

1.6.2 Data Collection

Data collection was conducted in the form of online video-recorded semi-structured interviews. The researcher opted to use the Zoom Communications Inc. (“Zoom”) platform to conduct these semi-structured interviews. Permission to contact the DRMMs via their work email accounts was obtained from the management committee of the private radiology practice. The researcher was cognisant of the participants' many obligations and scheduled an online interview time that was convenient for the

participants. During the data collection process, the researcher was mindful to be punctual for the specific interview and ensured the participants were comfortable before starting the interview recording.

1.6.3 Data Analysis

The recorded interviews were transcribed, after which data analysis commenced. As explained by Nowell et al. (2017: 5), qualitative researchers should immerse themselves in the data after data collection to familiarise themselves with the data to search for meanings and patterns before developing themes. Nowell et al. (2017: 1) acknowledged that the data analysis of qualitative research is the most complex phase and one that receives the least thoughtful discussion in the literature. Maguire and Delahunt (2017: 3352) describe thematic analysis as the process of identifying patterns or themes within qualitative data. It then uses these themes to address the research or to bring a point across about an issue.

1.6.4 Trustworthiness

Nowell et al. (2017: 1) stated that for qualitative research to be recognised as trustworthy, qualitative researchers must verify that data analysis has been conducted in a precise, consistent and exhaustive manner whilst revealing the detailed methods of analysis to enable the reader to conclude whether the process is credible. Similarly, Ayton (2023: 233) explained that in qualitative research, rigour or trustworthiness refers to how researchers demonstrate the quality of their research. During this study, the researcher remained cognisant of their personal opinions and therefore focused on interpreting the data using the direct quotations of the participants. Cypress (2017: 254) explains that meticulous attention to the reliability and validity of research studies is vital in qualitative research. Nowell et al. (2017:2) agreed that if readers are unclear about how researchers analysed their data, evaluating the trustworthiness of the research process is difficult. Cypress (2017:254) defines rigour of qualitative research as the quality or state of being very exact, careful, or treating the data with strict precision. The author further explains that without rigour, research is worthless, becomes fiction and loses its use therefore, conducting qualitative studies with extreme rigour because of the potential for subjectivity when dealing with narratives

and people are advocated by Cypress (2017:254). As emphasised by Ayton (2023: 233), research is considered trustworthy when members of the research community are confident in the study's methods, the data and its interpretation. To ensure rigour during this study, the researcher followed the principles of credibility, dependability, transferability, and confirmability.

1.6.5 Ethical Considerations

Before conducting this research, ethical permission was obtained from the Research Ethics Committee of the Faculty of Health and Wellness Sciences at the Cape Peninsula University of Technology (CPUT). The Research Ethics Committee study approval reference number is CPUT/HWS-REC 2022/H13. The managing committee of the radiology practice provided permission to conduct this study. During the research process, sound ethical principles were continuously adhered to. To ensure the autonomy of participants, it was highlighted to them that participating in the study was completely voluntary. The researcher followed the principles of the Declaration of Helsinki, which states that medical research is subject to ethical standards that promote and ensure respect for all human participants by protecting their health and rights (World Medical Association, Declaration of Helsinki, 2024). As reiterated by Drolet et al. (2022: 277), research projects must always be designed to respect the rights and interests of research participants, and not just those of researchers.

Participants were provided with a participant information letter that explained the purpose of the study and whereby they could give written informed consent. Anonymity was ensured during the study as well as during the data analysis process by only referring to the DRMM by a pseudonym, and all personal identifiers were removed.

1.7 Positionality statement

Background: I am a female radiographer with a cultural background from a previously disadvantaged ethnical group. I have a strong interest in radiography education as well as the management aspects of radiography departments. While working as a radiographer, I obtained postgraduate professional qualifications in both CT and MRI imaging, along with a postgraduate Certificate in Managing for First Line Managers.

Experience: I am employed at the radiology practice where this study was conducted. I have worked as a diagnostic radiographer with a special interest in CT and MRI imaging for 16 years before transitioning into my current role as middle manager, a position I have held for the past eight years. At this radiology practice, the DRMMs are referred to as the Head of Department, who is responsible for the general management of the department and fulfilling all duties of managing the radiography department.

Biases: Being a DRMM gave me insights into the working conditions of managers working during the COVID-19 pandemic. Thus, the research can be traced back to the many days of self-reflection and questioning of the new working conditions brought on by COVID-19. I had a specific interest in the experiences of my fellow DRMMs. While embarking on this study, I was aware of my own experiences and preconceived ideas. I therefore had to be cognisant of bracketing my own feelings and ideas when interacting with the study participants and when listening to the participants' experiences.

1.8 Division of Chapters

The following illustration provides an overview of the division of chapters within this thesis.

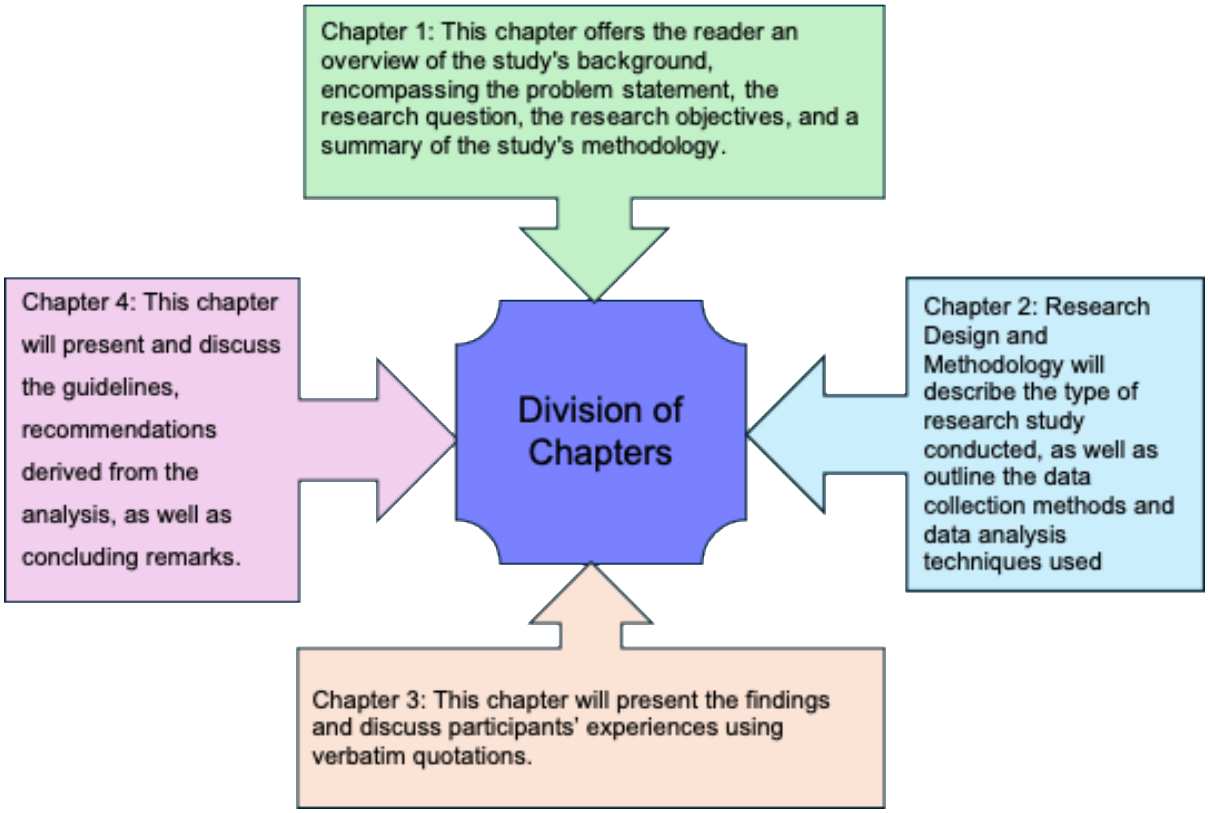

FIGURE 2: DIVISION OF CHAPTERS

1.9 Chapter Summary

In this chapter, a broad introduction was given to the research study, which included the background, research aim and objectives. Additionally, the research question and problem statement were also provided. The methodology, including ethical considerations, was briefly discussed, with further elaboration provided in Chapter 2.

CHAPTER 2

RESEARCH DESIGN AND METHODS

2.1 Introduction

In this chapter, the research philosophical assumptions (research paradigm), research design and methods deployed to answer the research question: “What were the experiences of diagnostic radiography middle managers (DRMMs) working at a private radiology practice within South Africa during the COVID-19 pandemic?” will be discussed. The ethical considerations and trustworthiness principles that applied during the study will also be discussed.

2.2. Research Paradigm

2.2.1. Epistemology

The epistemology of this research study was based on interpretivism. The definition of epistemology is described by Sawatsky et al. (2019: 16) as a belief about the nature of knowledge. Alharahsheh and Pius (2020: 40) described epistemology as the process by which a researcher aims to uncover knowledge and understand reality, and how a researcher perceives the world around them.

2.2.2 Interpretivism

As described by Ayton and Tsindos (2023: 16), interpretivism can be seen as the researcher aiming to understand what it is to be human, along with the significance and meanings that people assign to life events. Alharahsheh and Pius (2020: 41) argue that interpretivism is concerned with in-depth variables and considers humans as different from physical phenomena, as they create further depth in meanings with the assumption that human beings cannot be explored in a similar way as physical phenomena. Additionally, the authors described interpretivism as being different to positivism as it seeks to include richness in the insights gathered. Alharahsheh and Pius (2020: 41) also argue that interpretivism allows researchers to explore further

depth and insights into individual experiences through formal discussion and interviews.

2.2.3 Methodology

Methodology as describe by Ayton and Tsindos (2023:16) is considered the research approach, and in qualitative research, it includes different study designs such as descriptive, phenomenology, action research, case study, grounded theory and ethnography.

2.2.4 Ontology

As described in Junjie and Yingxin (2022: 11) ontology can be defined as the essence of reality and is concerned with determining the nature of the existence of a specific phenomenon. Pretorius (2024: 2699) describes the ontology as the term that interrogates the nature of reality. Pretorius (2024:2699) further explains that a realist ontology is a single, tangible reality that can be observed, measured and understood through empirical evidence, adding that relativist ontology suggests that reality is not a fixed entity but is shaped by individual and collective experiences. The author further explains that researchers who adopt a relativist ontology emphasise the importance of understanding how people make sense of their world.

2.2.5 Axiology

The axiology is described by Pretorius (2024: 2698) as the role of values in research. Pretorius (2024: 2700) stressed that axiology plays a pivotal role in shaping the ethical and moral dimensions of research as it prompts the researcher to consider the role of their own values, beliefs and biases in the design, conduct and interpretation of their studies.

2.3 Research Design

This study employed a qualitative approach with a case study design using both descriptive and exploratory elements to gain an in-depth understanding of the experiences of DRMMs. Aspers and Corte (2019: 150) described research design as the activity performed to obtain knowledge through systematic procedures. Akhtar

(2016: 68) documented that research design can be seen as the “glue” that holds all the elements in a research project together.

2.3.1 Qualitative design

Basias and Pollalis (2018: 94) describe qualitative research design as a broad term that embraces research methodologies that deal with phenomena by analysing experiences, behaviours, and relations, while Jorge and Fridell (2021: 379) argue that a qualitative research method is used to allow respondents to discuss freely and to give developing responses. Expanding on this explanation, Sawatsky et al. (2019:15) describe a qualitative research method as observations being made in the real world, usually taking the form of words, pictures, documents, and other symbols. In line with this, Lester et al. (2020: 96) regard qualitative data analysis as a means of bringing meaning to a dataset by using conversational data, observations and interviews.

Basias and Pollalis (2018: 94) upheld that a qualitative method does not make use of statistics, or mathematics nor does it process numerical data. Expanding on this Nassaji (2020: 427) defined good qualitative research as being robust, well-informed, and thoroughly documented. Aspers and Corte (2019: 153) explained that qualitative research generates understanding in the iterative process by making new distinctions and generating new data.

A qualitative design was therefore considered appropriate since the researcher aimed to explore how DRMMs working within the diagnostic radiology practice navigated the operational aspects during the COVID-19 pandemic and to gain insights into their experiences.

2.3.2 Exploratory and Descriptive Research

Hunter et al. (2019) describe exploratory research as a methodological approach aimed at discovery and understanding. The authors define it as a distinctive way of conducting science and as a broad-ranging, purposive, systematic, prearranged

undertaking that is designed to maximise the discovery of generalisations, leading to describing and understanding an area of social or psychological life. Mbaka and Isiramen (2021: 32) stated that exploratory research is used to gain an in-depth understanding of human behaviour, experience, attitudes, intentions, and motivations, based on observation and interpretation, to find out the way people think and feel. The authors further described it as a form of research where more weight is given to the views of the participants.

Descriptive research, as explained by Colorafi and Evans (2016: 2) is amenable to health environments research as it provides cultural responses to questions about how people feel about a particular space, their reasons, who is using services and factors that hinder usage. The authors additionally stated that researchers using qualitative descriptive research methods stay closer to their data and the surface of words and events. As the researcher in the current study aimed to explore the experiences of the DRMMs working at a specific radiology practice, it was deemed appropriate to use this research design.

2.3.3 Case Study

This study was conducted in the form of a case study as one private radiology practice comprising multiple imaging branches were the study site of interest. A case study, as described by Akhtar (2016: 75) aims to identify the exact factors and causes that reveal the behavioural patterns of a unit and its place in its social environment. According to Akhtar (2016: 75), a case study analyses the subject matter qualitatively (in this instance, the responses of participants about their experiences during the COVID-19 pandemic) and covers all aspects of the single entity.

2.3.3.1 Reasoning Strategy: Inductive Approach

An inductive research approach, as explained by Liu (2016: 129), has become a growing trend in qualitative scholarship, characterised by its methodological flexibility. A suitable method proposed by Guest et al. (2020: 2) for qualitative data collection techniques that aim to generate narratives through focus groups or one-on-one

interviews using open-ended questions is inductive probing. Guest et al. (2020: 13) further highlight that the process of inductive analysis can be applied either prospectively, during data collection and analysis, or retrospectively, after data collection and analysis are complete. Kim (2021: 151) described the inductive research approach as starting with a set of observations and then progressing into the formulation of broader generalisations of those experiences; thus, this approach moves from data to theory, or from the specific to the general.

With this study, the researcher followed an inductive approach by conducting a comprehensive analysis of the data, identifying prominent codes which were documented in a codebook, leading to identifiable categories and prominent themes from the responses and the researcher's observations of the research participants.

2.4 Research Methods

Firdaus et al. (2021: 1) stated that the methods available to use in manufacturing a research study are commonly referred to as research methodologies, which are useful for distinguishing the type of research being carried out. The authors elaborated that several kinds of research methods can be used, including quantitative and qualitative methods. Firdaus et al. (2021: 1) defined the methodology as a body of methods and rules followed in science or discipline, with the method referring to a regular, systematic plan or a way of doing something. The following sections will describe the methods used to conduct the research.

2.4.1 Research Setting

The study was conducted across the various branches of a private diagnostic radiology practice operating in two provinces in South Africa, namely the Western Cape and KwaZulu-Natal. There were ten branches included in the study, with nine branches situated in the Western Cape and one branch situated in KwaZulu-Natal.

2.4.2 Research Population Sampling

Diagnostic radiography middle managers working at a private radiology practice that operates at hospitals in the Western Cape and KwaZulu-Natal in South Africa were

sampled through a purposive sampling method. The total study population consisted of 11 DRMMs, recruited from 10 radiology branches, all of whom were female participants. During the study's inclusion period, a change of management occurred at one branch in the Western Cape. Consequently, two DRMMs were invited to participate in the study. As explained by Taherdoost (2016: 23), purposive or judgmental sampling falls under non-probability sampling and is a method where participants are selected deliberately because they can provide important information that cannot be obtained from others. Sawatsky et al. (2019: 16) also describe purposive sampling as the choice of participants whose perspectives or experiences are relevant to the research question. As described by Taherdoost (2016: 22), non-probability sampling is often associated with a qualitative, case study research design, and it has a clear rationale for the inclusion of some individuals in the research study. Participants are therefore not randomly selected. Thus, it was deemed appropriate to use purposive sampling in this research study because the aim was to gain an understanding of a certain topic from specific individuals. In this case, the real-life experiences of DRMMs working at a private radiology practice during the COVID-19 pandemic were explored.

2.4.2.1 Inclusion Criteria

The participants included in the study were:

- The DRMMs who were employed at the 10 branches of the private radiology practice within the Western Cape and KwaZulu-Natal at any point between March 2020 and April 2022. This timeframe indicates the start-to-end dates of the South African national state of disaster (South Africa, Department of Co-Operative Governance and Traditional Affairs, 2022). This specific timeframe and inclusion criteria were selected as the researcher wanted to include the experiences of as many DRMMs as possible who were employed as radiography middle managers at the research site during the COVID-19 pandemic.

2.4.2.2 Exclusion Criteria

The study excluded DRMMs who were:

- Not employed as a diagnostic radiography middle manager at the private radiology practice between March 2020 and April 2022.
- Employed at government health facilities and other private radiology practices.
- Working in disciplines outside of diagnostic radiography.
- Nonconformant by not returning the participant consent form before the allowable time had passed.

2.4.2.3 Recruitment strategy

Permission to contact the prospective research participants was sought from the managing committee of the private radiography practice. This involved writing an email to the managing committee requesting permission to contact participants through their official work email addresses (Appendix A). After permission was granted (Appendix B), the researcher compiled an email with several attachments, which included the permission letter from the practice, participant information letter, and the participant consent form (Appendices C & D). The email was distributed to the work email addresses of all the DRMMs employed at the radiology practice. This ensured that the distribution of information was sent directly to the DRMMs. The researcher reserved one month for DRMMs to respond to the study invitation. After the initial 3 weeks had passed, a reminder email was sent to potential participants using the student e-mail address instead of the work e-mail address to avoid coercion and the perception of a command coming from a colleague. The researcher remained mindful of the participants' right to decline to participate in the study; therefore, no further contact was made with the DRMMs after the initial reminder was sent.

2.5 Data Collection

Nassaji (2020: 427) upheld that in qualitative research, data are collected through collection tools such as interviews, field notes, diaries and observations. Data

collection was conducted with 11 DRMMs who had voluntarily provided informed consent to participate in the study, and after all applicable permissions were in place. Data collection in this study was in the form of one-on-one online video-recorded semi-structured interviews to obtain the experiences of participants during the COVID-19 pandemic. Mwita (2022: 415) explained that in semi-structured interviews, researchers prepare a list of questions to ask their participants, with an option to ask follow-up questions for further clarification.

The semi-structured interviews were preferred as they provided the researcher with the opportunity to have one-on-one conversations with each participant, with the added advantage of using a blend of closed- and open-ended questions. Fundamental questions that were posed to participants in answering the research questions can be found in the interview guide (Appendix E). In addition to collecting verbal responses, the researcher could also observe the non-verbal cues such as body language, facial expressions, and gestures exhibited by the participants. By doing so, the researcher could delve deeper into the meanings and underlying understanding of the answers provided, thus gaining a more comprehensive perspective. Written informed consent was obtained from each participant to record the interview. Hunter et al. (2019) assert that the interviews should be arranged at a time and venue that is convenient for participants. The authors argue that this approach is used to help reduce the researcher-participant power imbalance, which may exist.

The researcher chose to use the Zoom Communications Inc. (“Zoom”) platform to conduct the semi-structured interviews. The researcher based this decision on the ease of use, the researcher’s level of comfort with the platform and the feasibility. As explained by Gray et al. (2020: 1293), Zoom offers a free basic program (with the option to upgrade for a monthly or annual fee), and the researcher was only required to download the program. Furthermore, Gray et al. (2020: 1293) explain that the online platform can interview more participants in a shorter amount of time and saves costs by eliminating travel time. The added benefits of using Zoom for semi-structured interviews, as explained by Gray et al. (2020: 1295) are that it provides a live secure

link that only requires participants to click on the link to join the meeting. Additionally, it has password protection capability for confidentiality, and the recording capacity automatically saves the interview into two files, namely an audio-only file, and a combined audio-video file. A secure link which allows access to the interview was sent to participants' work e-mail addresses. These accounts are protected by phishing software to avoid unauthorised access to work e-mails.

At the beginning of the online semi-structured interview, participants were informed that they could withdraw their consent at any time if they felt uncomfortable and no longer wished to participate. The participants were addressed by their names during the interview process but were assigned pseudonyms during the data analysis process. The estimated average duration of the interviews was between 22 – 50 minutes per interview. The recording was downloaded onto the password-protected personal laptop of the researcher. Backup data was stored on the password-protected iCloud account of the researcher. Additionally, backup data was stored on an external hard drive and stored in a lockable drawer in the researcher's home office, which was accessible by the researcher only.

Data collection was conducted over two non-consecutive months, December 2022 and March 2023. This timeframe was influenced by work schedules and participant availability. During data collection, the researcher was cognisant of data saturation applicable to qualitative research. Guest et al. (2020: 5) explain saturation as the point reached during data analysis when incoming data produces little or no new useful information relative to the study objectives. Similarly, Weller et al. (2018: 1) assert that sample size determination for open-ended questions relies primarily on finding the point where little new information is obtained through thematic saturation. As discussed in Mwita (2022: 415), in reaching this point, the number of interviews conducted has an impact as it is believed that saturation is often reached between the 9th and 17th interview. This implies that, on average, saturation is reached by the 13th interview.

Weller et al. (2018: 2) further explain that since the goal of qualitative research is not necessarily to collect all or most ideas and themes but to collect the most important ideas and themes, salience may provide a better guide to sample size adequacy. The authors explain that salience can be measured by the frequency an item/theme occurs or the order of mention by study participants. The authors conclude that saturation may be more meaningfully and productively perceived as a point where the most salient ideas have been obtained. While acknowledging that qualitative research talks about data saturation, Tight (2023: 5) argues that it is to the extent that each life is unique. The author concedes that no data are ever truly saturated, arguing that there are always new things to explore. In this study, the researcher found that as the interview progressed, the participants started to remember things at various stages of the questioning, and valuable data emerged that the researcher felt would be of value in writing up the recommendations of the study. The researcher, therefore, decided to continue conducting all the interviews to gain rich, unique data. Subsequently, all 11 participants who voluntarily agreed to participate in the study were interviewed.

The audio recordings were compiled into a secure zipped folder and sent via email in a secure link given only to the transcriber. The transcriber signed a confidentiality agreement before accessing the audio files (Appendix F). The transcriber returned the completed transcripts via email to the researcher. The researcher started data analysis only after all the transcripts were received from the transcriber.

2.6 Data Analysis

After all the transcripts were received, the researcher checked them by listening to all the audio recordings while reading the transcripts. The researcher read and re-read the responses to get familiar with the content and identify common codes. The researcher conducted manual coding, where the codes were entered into an Excel spreadsheet (Microsoft Office). Data analysis was conducted using thematic analysis. Maguire and Delahunt (2017: 3352) describe a thematic analysis as the process of identifying patterns or themes within qualitative data. The goal of thematic analysis is to identify themes or patterns in the data that are important or interesting (Maguire &

Delahunt, 2017: 3353). It then uses these themes to address the research or to bring a point across about an issue. Lester et al. (2020: 98) agreed that the value of thematic analysis by structuring data in phases is that it creates a transparent process for both the qualitative researcher and the reader of a given research report.

The researcher followed the six steps of thematic analysis as described by Clarke and Braun (2013: 3). Clarke and Braun (2013: 3) professed that analysis is a recursive process and warned that this framework should not be viewed as a linear model where one cannot proceed to the next phase without correctly completing the prior phase.

- Step 1: Familiarisation with the data.
  - Clarke and Braun (2013: 3) stated that for all forms of qualitative analysis, the researcher must immerse themselves in their data by reading and re-reading the data.
  - After digitally receiving the transcripts from the transcriber, the researcher printed all the documents for ease of reading. These were read and re-read, and rough notes were made on the extracts, and interesting concepts were underlined. The printed documents were kept safe in a folder in a lockable drawer in the home office of the researcher.
  - Through the use of recorded interviews as the data collection method for this research study, the researcher had the advantage of replaying the recordings a few times to further familiarise herself with the content and note non-verbal cues.

- Step 2: Generated initial codes.
  - Clarke and Braun (2013:3) described this step as not just a method of data reduction but also an analytic process. The authors explain that codes capture both the semantic and conceptual reading of the data.
  - As described by Maguire and Delahunt (2017: 3355), during this step, data is organised in a meaningful and systematic way, and coding reduces lots of data into smaller chunks of meaning.

- By using the Excel application, the researcher of this study worked through each segment of the text that seemed relevant or that specifically addressed the research questions by writing the phrases in a column next to the extract.
- During this step, the data was handled by using the tools available from the Excel application, like highlighting similar concepts in the same colour.

♦ Step 3: Search for themes.

- Clarke and Braun (2013:3) described searching for themes as coding your codes to identify similarity in the data. They described this as an active process where the researcher constructs themes and ends the phase by collating all the coded data relevant to each theme. Maguire and Delahunt (2017: 3356) characterised themes by their significance.
- For this study, the researcher carefully analysed the codes and grouped them into different initial categories.
- Each category consisted of many codes relevant to the objectives and research question of the study. Subsequently, categories were combined to form themes.

♦ Step 4: Review themes.

- As described by Nowell et al. (2017: 9), the fourth phase is the stage where the preliminary themes require refinement, as some might not have enough data to support them, and some may merge. Clarke and Braun (2013:4) also explained that researchers should reflect on whether the themes support the data by defining the individual themes and the relationship between themes.
- After reviewing the initial themes and with the input and guidance of the research supervisors, the researcher refined the themes into more meaningful and clearer themes.

♦ Step 5: Define and Naming Themes

- Clarke and Braun (2013: 4) advised that during this step, the researcher should identify the essence of the theme and construct a concise, punchy and informative name for each theme. Nowell et al. (2017: 10) advised that

the researcher must identify concepts that are of interest to the research study and how theme names will support the research questions. Nowell et al. (2017: 10) assert that the theme names must be concise and immediately give the reader a sense of what the themes are about.

- Accordingly, the researcher developed theme names that embodied a meaningful and comprehensive description of the subject matter.

- Step 6: Writing up
  - Clarke and Braun (2013: 4) described this phase as an integral element of the analytic process in thematic analysis. Nowell et al. (2017:10 &11) advise that during this phase, the researcher must write the thematic analysis to provide a concise, coherent, logical, non-repetitive, and interesting account of the data. The authors further advise that direct quotes from participants are an essential component of the final report.
  - Nowell et al. (2017: 11) suggest that short quotes may be included to aid in the understanding of specific points of interpretation and to demonstrate the prevalence of the themes.
  - The researcher incorporated verbatim participant quotations to enhance the authenticity of the data.

2.7 Trustworthiness

Nowell et al. (2017: 5) advised qualitative researchers to approach the analysis as truthful observers of the data, being honest and vigilant about their perspectives, beliefs and preexisting thoughts. Cypress (2017: 254) describes trustworthiness as the truthfulness, quality and authenticity of the findings of qualitative research. It relates to the degree of confidence or trust readers have in the results of the research. The author accentuates that methods used during trustworthiness can verify that one has carried out the research process using the steps followed in the data analysis process. Cypress (2017: 254) further highlights that meticulous attention to the reliability and validity of research studies is vital in qualitative research work and that

the researcher's subjectivity can readily cloud the interpretation of the data. Cypress (2017: 254) defines rigour of qualitative research as the quality or state of being very exact, careful, or treating the data with strict precision, and asserts that without rigour, research is worthless, becomes fiction and loses its use. The author advises that, because of the potential for subjectivity when dealing with narratives and people, extreme rigour must be applied in qualitative studies. To ensure rigour, the principles of trustworthiness, namely credibility, dependability, transferability, and confirmability, were adhered to.

2.7.1 Credibility

Nassaji (2020: 428) described credibility as the extent to which the findings reflect the reality of the phenomenon investigated and the truthfulness of the findings. The author further stated that to achieve this, the researcher needs to ensure that his or her understanding of the research participants, processes, and context is as accurate and complete, with inclusive interpretations. Since the researcher was part of the DRMM structure at the private radiology practice, she had insights into the working context where the research was conducted. However, the researcher was cognisant of bracketing her views and opinions. Careful attention was given to describing the experiences of the participants by using direct quotations. Nowell et al. (2017: 11) explain that extensive quotations may be included to give the reader a sense of the original text and to convince the reader of the validity and merit of the analysis.

Another aspect the researcher was cognisant of, was reflexivity. Reflexivity, as described by Berkovic (2023: 242), involves researchers acknowledging and disclosing their involvement in research to understand their impact on it. It is described by Olmos-Vega et al. (2023: 242) as a set of continuous, collaborative, and multifaceted practices through which researchers self-consciously critique, appraise, and evaluate how their subjectivity and context influence the research process. The authors identified four types of reflexivity, namely, methodological reflexivity, contextual reflexivity, personal reflexivity, and interpersonal reflexivity. Personal reflexivity, as described by the authors, requires researchers to reflect on and clarify their conscious and unconscious reactions to contexts, data, participants,

expectations and assumptions. To harness reflexivity in research, it is suggested that researchers incorporate a reflexive writing approach to reflexivity (Olmos-Vega, 2023: 245). The authors further elaborated that this includes any written or recorded reflections occurring at any point in the research process, including forms of documentation such as field notes and researcher memos.

Since the researcher was a DRMM at this study site and was familiar with the practices and processes, she applied bracketing so that her own opinion would not influence the data, thus ensuring an accurate representation of the participants' experiences. Bracketing is described by Berkovic (2023: 244) as a method used in qualitative research to manage preconceptions of a researcher, whereby the researcher is attentive to their own beliefs/ interactions with the research topic to remain impartial throughout the research process. Dörfler and Stierand (2020: 2) concur that bracketing is a method used in qualitative research to mitigate the potentially adverse effects of preconceptions that may taint the research process.

The researcher, therefore, engaged in debriefing sessions with the research supervisors to limit potential researcher bias. These debriefing sessions assisted with framing ideas and reserving the researcher's personal opinions. The researcher kept a diary to outline the research process that was followed. Before the start of each interview, the researcher reminded herself that she was a student, not a colleague and consciously applied this student mode attitude whereby she removed herself from the data, put her own experience aside and focussed on the responses of the participants. The researcher made reflective notes during interviews. The researcher used direct quotations from the participants extensively to give the reader a sense of the authenticity of the responses and the development of the themes. The researcher's awareness of personal biases helped maintain objectivity in data interpretation by fostering an open-minded and reflective approach throughout this study's analysis process.

2.7.2 Dependability

As described by Nassaji (2020: 428), dependability specifies that the study should be reported in such a way that when others review the data, they could arrive at similar interpretations. This can be enhanced by carefully documenting any changes that may occur as the research evolves, as well as all the research activities and the conclusions. Such documentation can then be reviewed by an outside researcher to examine the extent to which the conclusions are grounded in the data and its accuracy. Nowell et al. (2017: 3) found that to achieve dependability, researchers can ensure the research process is logical, traceable, and documented. When readers can examine the research process, they can advise on how a research study may demonstrate dependability for its process to be audited, and they can judge the dependability of the research. During the current study, the researcher kept a record of all the research steps, the audio-video recordings, personal reflections and participant transcriptions.

2.7.3 Transferability

Transferability, as described by Nassaji (2020: 428), refers to the extent to which the researchers' interpretation or conclusions are transferable to other similar contexts and requires a thorough and rich description of the research activities and assumptions. The author elaborates that because qualitative research is interpretive, and the participants are often small in number and not representative of the population, the findings cannot be generalisable. Therefore, in this study, the researcher provided sufficient details of the context to make transferability possible in case researchers wish to do so. Furthermore, a dense description of the study participants, methodology and findings of the study is provided.

2.7.4 Confirmability

Nassaji (2020: 429) describes confirmability as the extent to which others confirm the researcher's conclusions and interpretations, and it accentuates the researcher's engagement and active role in the research process. The author elaborates that confirmability in qualitative research also resembles replicability, which is described as the extent to which a study can be reproduced or duplicated. The author further

declared that by describing the data and the findings in such a way that their accuracy can be confirmed by others, confirmability can be established. For the current study, an audit trail is available whereby the researcher documented all the steps taken and the decisions made regarding the analysis and coding of the data. These records, together with all audio-recordings and transcriptions, will be kept for 5 years after completion of the research. After 5 years, the printed transcripts will be shredded and the digital copies deleted from the iCloud account of the researcher.

2.8 Ethical Considerations

Ethical permission to conduct the study was obtained from the Research Ethics Committee of the Faculty of Health and Wellness Sciences at the Cape Peninsula University of Technology (CPUT) - Appendix G.

As stated in the Declaration of Helsinki, the primary purpose of medical research involving human participants is to advance individual and public health by generating knowledge to understand the causes, development and effects of diseases, and to improve preventive, diagnostic and therapeutic interventions (World Medical Association, Declaration of Helsinki, 2024). The declaration reiterates that the rights and interests of individual research participants can never be superseded by these purposes. The Declaration of Helsinki states that potential participants must be informed of the right to refuse to participate in the research or to withdraw consent to participate without reprisal at any time (World Medical Association, Declaration of Helsinki, 2024). Permission to invite the middle managers from the selected private practice branches and to contact them via their work email addresses was obtained from the managing committee of the relevant private radiology practice. To ensure the autonomy of participants in this study, participants were assured that participation was completely voluntary and that all information gathered was regarded as private and confidential.

No personal information of participants was required for this research study, and all personal identifiers that were revealed during data collection were anonymised. Participants received a participant information sheet explaining all details related to the study before partaking in the study. Participation was completely voluntary, and participants had to sign and return the online video consent form before partaking in the interview. Interview links created through Zoom Communications Inc. were distributed via email, and consent was further assumed when participants clicked the link to join the meeting. Participants were not coerced, nor were they compensated to participate in the study.

Confidentiality was ensured by storing the data on the researcher's personal, password-protected laptop. Additionally, data security was enhanced by backing up the data on the researcher's iCloud account in a password-protected folder. The researcher had a confidentiality agreement with the transcriber, and audio recordings were sent via a secure email link to the personal email account of the transcriber. Anonymity was ensured by removing any personal identifiers from the data. The name of the private radiology practice that served as the research study site was anonymised and will remain anonymous during any publications that may arise from the research. During the write-up of this research study, all information gathered, including field notes (Appendix H), was kept anonymous and confidential in keeping with the Protection of Personal Information Act (POPIA) (South Africa, 2019), which aligns with ethical principles. The researcher also undertakes to destroy all data within 5 years after the completion of the research study. Personal notes and printed transcripts will be shredded, and digital copies will be deleted from the iCloud account.

2.8.1 Autonomy

Owonikoko (2013: 242) stated that during research studies, autonomy (or respect for people) demands that the ability of competent subjects to make their own decisions be recognised and respected, while also protecting the autonomy of the vulnerable by preventing the imposition of unwanted decisions. The author further clarified that the practice of informed consent is derived from this basic principle, whereby a research participant or legally authorised representative is allowed to make an informed

decision to participate in a study or not. Although the consent process might be misunderstood as simply obtaining the subject's signature on a document, granting consent should be viewed as an ongoing process that only concludes once a subject has achieved a predefined status in the study or has terminated participation.

At the start of this study, potential participants were invited to participate by providing them with an information letter, stating the purpose of the study and informing them that participation would be entirely voluntary. Except for sending one email reminder three weeks after the initial study information, the researcher made no further contact with potential participants until the researcher received their signed informed consent document. All participants were informed that they could withdraw their consent at any time during the study.

2.8.2 Beneficence and Non-maleficence

Manda-Taylor et al. (2017: 269) described beneficence as "a positive requirement to do good to others". The authors explained that the principle of beneficence is closely related to non-maleficence, which stipulates the obligation, Primum non-nocere ('first of all, do no harm") principle. Combined, these two principles assert that each action must produce "more good than harm" to the individual patient/ participant (Manda-Taylor et al. 2017: 269). Owonikoko (2017: 242) agreed that beneficence and the twin concept of non-maleficence demand that research participants should not be harmed through the conduct of the study. During this study, every effort was made to ensure that no physical, mental, or emotional harm was inflicted on participants. However, the researcher was aware that since the questions focused on participants' experiences during the pandemic, some emotional responses may be triggered. To address this, participants were informed of the availability of emotional support services provided by Incon Health & Wellness, an external company contracted by the private radiology practice following the COVID-19 pandemic.

2.8.3 Justice

According to Manda-Taylor et al. (2017:269), when conducting research studies, justice relates to “fairness” and implies that everyone should be treated equally, fairly, and impartially. The authors also clarified that the principle of justice requires researchers to take the perspective of the whole population and balance competing values and interests, while recognising that decisions that benefit one group may result in harm to another. As the researcher was cognisant of treating all participants fairly, all DRMMs were invited to participate in the study, and they were given the option to partake in the interview at a time that was convenient for them. The researcher created a friendly atmosphere by smiling and nodding as participants continued to speak freely and elaborate in as much detail as possible.

2.9 Chapter Summary

In this chapter, information was provided about the study design, the study participants, data collection and data analysis, as well as the ethical considerations that were adhered to during the study. Trustworthiness and its associated criteria were discussed as these are important to show rigour in the research process. A detailed account of the data collection process was provided. In the next chapter the findings are presented and discussed.

CHAPTER 3

FINDINGS AND DISCUSSION

3.1 Introduction

This chapter presents the findings and discussion obtained following online semi-structured interviews investigating the experiences of DRMMs working at a private radiology practice during the COVID-19 pandemic. Semi-structured interview questions guided the interviews to answer the research question: “What were the experiences of diagnostic radiography middle managers (DRMMs) working at a private radiology practice within South Africa during the COVID-19 pandemic?”. The interview guide facilitated the semi-structured interviewing process by ensuring consistency of questions across participants, while allowing flexibility and in-depth exploration of participant responses.

This chapter will start with a presentation of the participants' demographic details, followed by the themes that were developed during the data analysis process. These themes will be discussed using a literature control and supporting verbatim quotations to corroborate the study findings.

3.2 Demographics of Participants

The participants had between six and more than 20 years of experience since qualifying in diagnostic radiography. Their experience as Diagnostic Radiography Middle Managers (DRMMs) varied, with some having less than five years of experience in the role, while others had more than ten years. Table 3.1 provides a summary of the demographic details of study participants.

TABLE 3.1: DEMOGRAPHICS OF PARTICIPANTS

Manager	Q1: How many years are you qualified as a diagnostic radiographer?	Q2: How many years of experience do you have as a DRMM	Q3: How many staff members do you manage at your branch?	Duration of interview recording. Time indicated in minutes & seconds
M1	6-10 years	Less than 5 years	Between 21-30	43:41
M2	11-15 years	Less than 5 years	Between 21-30	36:09
M3	20+ years	More than 10 years	More than 30	50:68
M4	20+ years	More than 10 years	More than 30	24:30
M5	16-20 years	Less than 5 years	Between 21-30	32:28
M6	20+ years	More than 5 years, but less than 10 years	Between 21-30	31:22
M7	20+ years	Less than 5 years	More than 30	35:46
M8	20+ years	Less than 5 years	More than 30	33:14
M9	20+ years	Less than 5 years	Between 21-30	35:45
M10	11-15 years	Less than 5 years	Between 21-30	27:17
M11	20+ years	More than 5 years, but less than 10 years	Between 21-30	22:52

3.3 Findings and Discussion

Thematic analysis was used to analyse data and to develop themes. The analysis involved a systematic approach to the transcribed data by using the six steps based on Braun and Clarke's (2006) framework for thematic analysis. The six steps required a structured approach to ensure a thorough analysis and interpretation of the qualitative data. From the data collected for this study, three themes and various categories were identified, as outlined in Table 3.2.

TABLE 3.2: THEMES AND CATEGORIES

Themes	Categories
1. Adapting to change	1.1 Increased administrative responsibilities 1.2 Comprehensive staff training and support 1.3 New operations management
2. Challenging environment	2.1 Emotional and psychological impact 2.2 Leave and financial uncertainty 2.3 Self-neglect and team focus
3. Managerial growth amidst the pandemic	3.1 Fostering teamwork and collaboration 3.2 Interdisciplinary support 3.3 Personal and professional growth

3.3.1 Theme 1: Adapting to Change

This theme was developed as it relates to the operational changes that were implemented during the COVID-19 pandemic. Participants reported that the operational adjustments were sudden, and they had to adapt to increased administrative responsibilities, develop new protocols and implement changes to maintain and prioritise imaging services. They described how quickly adapting to the changing situation was essential for managing the surge of patients and the heightened demand for specific imaging services while operating with a smaller team.

3.3.1.1 Category 1.1: Increased Administrative Responsibilities

In this category, the researcher identified the added administrative responsibilities the DRMMs experienced. Diagnostic radiology departments had to create swift changes from their normal and familiar operational conditions. Participants shared sentiments of feeling overwhelmed by the additional administrative responsibilities. Specifically, they expressed their shock at the amount of administrative work they had to document and keep records of. The workload was further complicated by the need to conduct meetings, maintain accurate charts, documentation and the billing of new medical aid

codes, all while adapting to the ever-changing protocols and procedures. Verbatim quotations demonstrate the increased administrative responsibilities:

M1: "Added duties, was tracking, so if someone came into contact, the endless paperwork of who was your first possible contact and how long you were in contact with that person, to then classify if you're going to go into isolation or not".

M2 "The protocol and the procedures were followed successfully through the communication that we had to do. I would say for us as the managers, it was one of those things that you had to conduct meetings every single day".

M3: "You don't think admin when you think Covid, but gee whizz, from my point of view, the admin was endless and that temperature checks, and that annoying thing when somebody was sick, you had to do that contact tracing form. That was my absolute worst, and then you had to do that check-in, day one to fourteen, where they must say my temperature is 32.4 today. And very hard to deal with when you were remote."

M8: "You had to document all the cleaning of the department, staff temperatures as they walk in and out, staff testing positive, you had to document it. Even if you give staff a mask, you must document it. It's like you got your whole PPE gear, you got everything you know, everything was, you get a visor and all that. So everything you had to monitor."

M10: "Those charts and documents that you had to fill in if a staff member just had a snotty nose and you had to monitor them, and this monitoring of the fever situation every single day – that was a lot. That's the only negative thing I had about that, that documentation"

Middleton et al. (2021: 706) described the role of nurse managers as highly important during the COVID-19 pandemic, as they needed to adapt to the rapidly changing

situation to ensure resources, information, updates in guidelines, and staff safety were implemented and communicated. This helped frontline nurses feel supported and prepared to face the unprecedented challenges. As described by Vázquez-Calatayud et al. (2021: 86), nurse managers identified adapting to change as a key experience that allowed nurse managers to respond to the pandemic, with the peculiarity that during crises, adaptation must be developed continuously and diligently. Adapting to the changes brought about by COVID-19 necessitated adjustments in the radiology department, resulting in additional tasks that DRMMs had to perform.

The experiences described in the participant narratives regarding the added responsibilities of DRMMs during the pandemic are similar to what was experienced in other radiology departments. As described by Sim et al. (2020: e310), the logistics section of their radiology department created monitoring charts for all PPE supplies, and that stocks were monitored daily. In addition, Sim et al. (2020: e309) emphasise the heightened cleaning responsibilities, noting that new protocols required radiology equipment and all department surfaces to be cleaned twice daily and after each use. However, the authors also note that contact tracing for radiology staff was not the responsibility of a single individual, such as a direct manager. Instead, it was carried out by a dedicated administrative team, which conducted activity mapping for staff members who had been in contact with infected patients.

While participants of the current study reported an increase in administrative responsibilities such as recordkeeping, contact tracing, and enforcing new protocols, Tay et al. (2020: 471) noted that department managers in their study had to perform a newly implemented daily walkabout in their departments. These walkabouts were to ensure infection prevention and control (IPC) standards were upheld, to address patient and staff safety issues and to identify ground issues. The reviewed literature thus indicates that an increase in administrative duties among departmental managers was a common response to the pandemic.

3.3.1.2 Category 1.2: Comprehensive Staff Training and Support

The utterances from DRMMs indicate that they felt unprepared to organise their personnel and readying their departments to comply with all the newly implemented guidelines. They shared how they had to ensure the radiology staff had a good understanding of the spread of the virus and how to prevent the spread of the virus. They had to educate their staff members on how to apply safe infection control measures. DRMMs found it challenging to educate radiographers on the safe usage and cleaning of equipment after examining patients infected with the coronavirus. Demonstrating correct cleaning methods, disinfecting the imaging equipment and work areas, and the correct disposal of used PPE were part of their new responsibilities. Participants mentioned the following:

M5: "I felt their fears with them. Every time there was a change to the policy, I was here with them, discussing it, talking through what the challenges are, talking through how we are going to implement what we need to implement, taking the ideas when they come to me with an idea and seeing how we can incorporate what they suggest into what we have to do as part of our protocol or policy"

M9: "I had to arrange handwashing workshops with the infection control sister from the hospital with the different teams on duty."

M1: "We had to teach staff and train them how to clean effectively. Cleaning, like extensive cleaning of the equipment, is required after each and every patient and also like mopping the floors, washing down the walls, it was just it's too much."

M2: "The practice employed extra cleaners, because the department had to be cleaned and we had those checklists as well to ensure that it was cleaned, and you, as a manager, you had to monitor that it was correctly done"

M11: "Remember the COVID waste, it all had to be put in plastic, red plastic bags and then put in a box and then another plastic bag, you know, this triple layers."

The responses from DRMMs indicated that the equipment damage resulted from insufficient knowledge regarding safe cleaning practices, and therefore, they had to conduct training sessions on how to safely clean the machines. These sessions were deemed vital as a few DRMMs in this study reported incidents of water damage to their mobile imaging equipment caused by radiographers directly spraying disinfectant onto the equipment. From the study conducted by Ding et al. (2020: 3606), the authors explained that improper use of a disinfectant spray may allow it to penetrate the equipment, causing a short-circuit, metal corrosion, or other equipment damage. In the study conducted by Chen et al. (2020: 4966), it was noted that demonstrations, including decontamination protocols for portable X-ray machines, were presented to radiographers. These protocols involved thoroughly cleaning the entire surface of the machine using standard antimicrobial wipes.

Parry et al. (2021: S192) identified radiology departments as being a potential source of infection to healthcare workers or uninfected patients during the pandemic. The authors stressed that prudent management of the radiology department was essential in limiting transmission of the disease to healthcare workers or normal patients visiting the radiology department (Parry et al., 2021: S193). Akudjedu et al. (2020: 2) emphasised the importance of the appropriate use of PPE and the implementation of strict IPC protocols for the management of the pandemic. Zhao et al. (2020: 3) elaborated that comprehensive disinfectant procedures like air disinfection, surface wiping disinfection and floor disinfection of different areas needed to be performed daily. DRMMs found that they also had to facilitate the safe disposal of used PPE to ensure staff members did not get infected with the coronavirus. They also had to oversee that radiographers adhered to the relevant regulations, and it was strictly forbidden to dispose of masks, gloves, caps, and other protective supplies in regular bins. In addition, DRMMs of this study also had to conduct demonstration sessions for

staff members to guide the correct procedure to safely discard contaminated COVID-19 waste.

Chen et al. (2020: 4966) corroborated the need for implementing measures to guide radiographers to safely dispose of contaminated PPE and coverings after imaging procedures. Sim et al. (2020: e310) also stated that online hand hygiene and infection control courses were provided to re-educate and train their staff members on the proper use of PPE. Zervides et al. (2020: 4) agreed that when dealing with a pandemic in a radiography department, it is important that immediate education and training of all members of staff are prioritised, especially infection control practices and decontamination methods.

3.3.1.3 Category 1.3: New Operations Management

Middle managers emphasised the difficulties they faced in aligning with the practice objectives and implementing changes received from top management. A few immediate adjustments they had to perform were to cancel all non-urgent bookings, and they needed to implement restrictions on staffing levels across different departments. DRMMs had to adapt the staffing rosters more frequently and assign different personnel to specific tasks to manage the workflow. Strict entry protocols and designated spaces for infected patients were implemented to safeguard uninfected individuals and streamline infection control within the department. They also expressed that they had to adapt to using different platforms for daily meetings, which facilitated communication and helped them navigate and brainstorm the new workflow with peers and top management. Participants mentioned the following:

M5: "We were heavily short-staffed compared to what our normal complement of staff is. So from an operations perspective, we had to limit bookings to what we could cope with."

M2: "Operationally we had to have one dedicated cubicle with the plastic curtain obviously whereby if a patient is a confirmed Covid positive or a PUI will have the

patient there and then it will be easy to clean the curtain, but the patients that were seen in trauma we used to do mobiles there and the ward patients.

M4: "We had questionnaires at the door when people entered the department, sanitising their hands, ensuring that anybody that entered the department had a mask on, so basically a screening procedure. We also had separate chairs, so people didn't sit next to each other. To limit seating, we stopped allowing relatives into the departments, ensuring that only those who needed to undergo examinations were present. We didn't allow even hospital staff to just walk through the departments."

M9: "Although the staff was appointed on a rotational basis because we had now had different teams to make sure that we kept the team safe. I had to create a standby person and an additional person in case of illness, and then also update and inform all of them about the changes"

M10: "So we tried to do all the COVID-19 patients at the end of the day, one after another. What we also had to implement was the transfer of the COVID-19 patients. We had to then arrange with reception at the hospital, and then there would be a complete basic lockdown from where the patient is transferred to until the patient is transferred back."

M8: "Our meetings were on a different platform, so we communicated via virtual meetings."

The operational principles described by Chen et al. (2020: 4966) in Singapore included minimising unnecessary imaging to reduce the spread of the pathogen to other patients and staff. During the COVID-19 pandemic, radiology departments had to adjust their normal operations to prevent the spread of the virus. Zhao et al. (2020: 2) described how their hospital in Wuhan, China, reorganised the radiology department into three distinct areas: a contaminated area, a potentially contaminated area, and a clean area. They also dedicated one of their CT scanners specifically to COVID-19-infected patients.

The adjustments to staff scheduling that DRMMs had to make to protect their teams during the COVID-19 pandemic posed a significant challenge for managers in the current study. They had to ensure their departments adhered to the national requirements of limiting the spread of the virus while maintaining adequate staffing to provide the necessary imaging services. DRMMs had to alter staff duty arrangements daily, especially if staff members became infected with the virus. They mentioned that because staff were working in different teams and fewer people were present on a normal shift, they could see that those on duty were overwhelmed.

The study by Vázquez-Calatayud et al. (2021: 85) described the challenges nurse managers experienced when some staff members got infected with the virus and a replacement staff member from another department had to step in. The nurse managers described this as adding more work for them because they had to train the stand-in staff members on short notice. In the study conducted by Leppäkoski et al. (2023: 4191), the authors explained that nurse managers felt they did not have enough time to sufficiently prepare for decision-making in the absence of clear evidence, and they felt moral distress and under pressure to make critical decisions related to scarce resource allocations.

McFadden et al. (2022:8) reported that participant managers in their study experienced a continuous need to modify working practices. This included extending working hours, restructuring staff and resource allocations, and revising departmental protocols to meet the evolving demand. The additional time required for donning and doffing PPE also led to adjustments in radiography shift patterns. Similarly, Zervides et al. (2020:5) underscored the critical importance of radiology departments consistently implementing strategies to enhance staff and patient safety, effectively manage increased workloads, and maintain preparedness for future pandemics. In comparison, nurse managers in the study by Leppäkoski et al. (2023: 4194) reported difficulties in establishing and communicating operational goals, citing frequent changes in targets, inconsistent communication, and a general absence of clear strategic direction during the crisis. These findings are consistent with the operational

challenges described by the DRMMs in the current study, reflecting similar difficulties encountered across both radiography and nursing management during the pandemic.

3.3.2 Theme 2: Challenging Environment

The participants described the coronavirus pandemic as a challenging environment that tested their leadership and managerial skills. In light of the uncertain work environment caused by the pandemic, the DRMMs in this study recognised the need to become organised and develop strategies to effectively navigate new and challenging circumstances. They acknowledged that radiographers were at the forefront of the pandemic and were, therefore, directly exposed to the virus. It was essential for DRMMs to empathise with the anxiety and fears radiographers faced while providing imaging services. A few DRMMs mentioned that they felt responsible for their staff members' well-being.

3.3.2.1 Category 2.1: Emotional and Psychological Impact

DRMMs mentioned that as the pandemic progressed, they realised radiographers were emotionally overwhelmed when dealing with patients infected with the coronavirus and offered support to their teams. They indicated that they needed to build a strong support system for their staff members and recognised the importance of being emotionally strong themselves. Despite feeling emotionally drained themselves, one DRMM compared herself to a lighthouse that had to be there for her team during this difficult time. They shared stories of increased stress, exhaustion and being overwhelmed with all their responsibilities. While some DRMMs reported feeling mentally fatigued, others felt guilty for not being directly exposed to the infected patients. Many struggled to handle the stress and found it difficult to express their feelings.

A few responses included the following:

M8: "So the pressure was quite high on the middle managers at that time. And to understand the virus and the effect it had on the staff, mentally and obviously their health. So if I look back, because of that unknown and fear we had obviously, we as middle managers had to stay calm and be more focussed to be there for the staff 24/7"

*M11: "I must admit I did feel overwhelmed with the responsibility; it was tough. I found that there were times when our own work was expected to carry on, but we had all this additional stress. It would've been nice if we could've had a debriefing at the end of all of this. Just a space where people can feel safe and talk about what they went through.***"**

M1: "It was just to keep calm and be that security and constant for them. It was checking up on their mental health and their physical health"

M3: "I did carry a sense of guilt about my role at the time, I realised in retrospect that, we did what we needed to do, I mean we were managing things from home. I've realised that I can't beat myself up about that, that definitely our role was valuable, it was valid, I guess that's me validating, validation for myself rather."

M5: "I had to focus on my team and how they're feelings and what they're dealing with rather than what I am going through and the fear."

M6: "We, as middle managers, we were expected to be the lighthouse basically for staff, when we ourselves were overwhelmed. You would come to your office and take a breather or you're screaming at your desk or what, so that when you go out, you're strong again."

In the study by Udod et al. (2020: 7), the study participants were middle managers of a large nonprofit organisation consisting of a network of stores and services, where it was found that a leader in an organisation motivates employees to work together and helps build supportive relationships among team members. The participants in the

study by Udod et al. (2020: 4) valued an open leader, who could recognise moods and issues in the workplace and could respond in an empathetic manner towards employees' emotions.

Nurse managers in the study by Vázquez-Calatayud et al. (2022: 84) expressed how they became aware of the need to project a sense of calm, security, confidence and apparent control of the situation. Furthermore, the authors described how the nurse managers understood the importance of not showing doubts and uncertainties in their daily work, nor projecting their concerns and fears. The study by Leppäkoski et al. (2023: 4193) indicated that nursing managers were concerned about the safety of their staff members and took related measures such as arranging protective equipment and providing psychosocial support to them.

Naylor et al. (2022: 188) reported that diagnostic radiographers may have experienced mental health challenges, particularly because of moral trauma, which occurs when individuals are confronted with situations they feel unprepared to handle. Similarly, Akudjedu et al. (2020: 2) described the necessity for the radiography departments to prioritise the health and well-being of the workforce during the pandemic. These findings align with the fears that DRMMs observed from their staff members, as well as the protective behaviour DRMMs felt towards their staff members. In response, DRMMs adopted protective behaviours and felt compelled to maintain an appearance of confidence and optimism to reassure and support their teams amidst uncertainty.

Akudjedu et al. (2020: 2) described the necessity for the radiography departments to prioritise the health and well-being of the workforce during the pandemic. Parry et al. (2021: S194) stated that to assist in staff well-being, the radiology staff members at their hospital in India were provided with psychological counselling. However, in the study by Flood et al. (2022: S32), therapeutic and diagnostic radiography managers shared that despite their efforts to provide access to psychological specialists for staff members, this service was underutilised, as there was reluctance to use the 'stigmatised' mental health services. Birken et al. (2018: 2) noted that middle

managers are more likely to engage proactively when they receive adequate support from top management. Leadership behaviours have been found to directly influence employees' abilities to meet and exceed employers' expectations in accomplishing organisational goals (Udod et al., 2020: 1). This highlights the importance of creating a supportive management environment, safeguarding the emotional well-being of radiography personnel, particularly in times of crisis.

3.3.2.2 Category 2.2: Leave and financial uncertainty

DRMMs reflected on the alternative measures put in place by the radiology practice management, considering the decline in imaging operations during the pandemic. They reported that the radiology practice enforced annual leave for some staff members as imaging operations were scaled down to comply with social distancing guidelines. Descriptions of cuts in salaries due to low patient numbers, unpaid leave days, and no overtime payment were also highlighted by DRMMs.

M1: "And then, there was also a time when our numbers were really low, and the company cut our salaries. So that was also, that was not a great time, as there was a bit of a communication barrier as well, and for some staff, more money was maybe taken and the thing is as a healthcare worker, you thought that it wouldn't happen to you because you are the one still working. Although we understand that a lot of revenue isn't coming in but it wasn't like there was a dead time, so that also was quite a big negative for me and my staff."

M2: "So a month, we had ten, each employee had ten unpaid leave days"

M8: "So during that time, we implemented also people couldn't claim their after-hours, so they couldn't claim during that time, because of the company's revenue. They took unpaid leave, and we obviously had to give them that overtime off. So that was also a very negative thing."

M9: "The staff battled with their financial stress and the salary cuts and the constraints that they have at home – where partners have lost their jobs.

M10: "We were rostered one week on, one week off. So that made it quite a bit difficult financially and physically."

DRMMs in the current study perceived uncertainty and a disconnect between financial cutbacks and the continued workload in radiology departments. Malhotra et al. (2020: 1527) reported in their research that decreased imaging request volumes resulted in significant financial loss to employees. The authors further noted that many practices chose to reduce working hours, with diverse practices being used, such as paid time off, and some employees being placed on furloughs due to the economic conditions. In the study by Patel et al. (2023: 4), it is reported that revenue from imaging finances was seen to decrease globally during the COVID-19 pandemic. The authors found that private radiology practices in their study experienced imaging volume decreases of up to 80%.

Patel et al. (2020: 8) further reported that salaries and bonuses for radiology staff were reduced, along with a decrease in overall hours worked. Ahuja et al. (2021: S34) pointed out that since radiology investigations had declined, with MRI volumes severely affected, there has been a decline in business by almost 60%-70%. Cavallo and Forman (2020: E143) also mentioned that radiology practices needed to address staffing challenges through a combination of reduced working hours, temporary salary cuts, bonus suspensions, furloughs and in the direst of circumstances, layoffs, to combat the economic impact of COVID-19 on radiology practices. These studies highlight the significant financial and operational challenges imposed on radiology departments during the pandemic.

3.3.2.3 Category 2.3: Self-neglect and Team focus

This category focused on the impact of self-neglect and team focus on DRMMs during the COVID-19 pandemic. Due to the demands of their roles, coordinating and ensuring the availability of essential imaging modalities, the DRMMs reported that these responsibilities took priority over their own well-being. They observed the exhaustion of radiographers and experienced private emotional breakdowns themselves, as they did not want to appear vulnerable. DRMMs believed they had to remain strong for their staff members and prioritised the emotional well-being and needs of their team over their own fears and challenges.

M5: "I had to focus on my team and how they're feeling and what they're dealing with rather than what I am going through and the fear. I didn't have time to sit and fear for myself, my life and my family. So, for me, I was just focusing on the team. And it helped me deal with what I was going through because I had something else to focus on."

M7: "So I do what must be done and then I'll think later, or I will rest later, or I will cry later. But when it's that crunch time, I will just be on the floor, perform what I need to do and then take it later at home and then just crash on the bed. The negative is that I took a lot of the emotions of the staff on myself. So I carried them in the pandemic. So that took a toll on me in the end."

M9: "*I had to literally take responsibility for my entire team's wellbeing*."

M3: "*I felt that for me, my big challenge was that the staff was protected. So I made sure that I was always on top of the PPE, but I allowed them to share their shifts even if it meant that we were going to use additional PPE, because their mental health and their physical strength were just as important as saving PPE for me."*

M4: "I felt very responsible for my staff at the time, so I felt like I had to keep them safe."

M11: "I must admit I did feel overwhelmed with the responsibility, and I also tried to limit days away from work and not take too much leave, not take big blocks at a time. It was tough, it wasn't easy."

The geriatric nursing managers in the study by Uvhagen et al. (2024: 362) described an almost unbearable work situation, attributing this to the need to cope with a massive information flow, added tasks and feelings of heavy responsibility. As described in Uvhagen et al. (2024: 364), the healthcare managers recounted that finding ways to communicate all the information to their staff was important to them, as well as being physically present to ensure that their staff members felt safe. As reported by Middleton et al. (2021: 706), nurse managers with high levels of anxiety were associated with the use of maladaptive coping strategies, which are denial, substance abuse, venting, self-blame or behavioural disengagement. As described in Vázquez-Calatayud (2021: 85) nurse managers' priority was with their staff members; to listen to them in case someone did not feel well enough to work; to talk to them and give them more days off if they needed it, or to replace them with other people, to ensure that their well-being is not compromised and avoid a feeling of being overwhelmed.

Flood et al. (2022: S28) agreed by stating that managers of healthcare teams have also been exposed to high levels of occupational stress as they had to manage rapidly changing guidelines, redeployment of staff, resource allocation and constant duties related to the safeguarding of their staff members. The authors further clarified that despite these internal stresses, managers were expected to acknowledge and support their staff psychologically while simultaneously managing their own emotions discreetly. Flood et al. (2022:S29) also pointed out that therapeutic and diagnostic radiography managers in their study spoke about how their work patterns were also impacted by the pandemic, with all managers indicating that to ensure the safety of their staff and patients, they worked longer hours. Ten out of 12 managers (both therapeutic and diagnostic) indicated that during the pandemic, they felt a responsibility to be on-site at all times and accessible to staff. The DRMMs of this

study expressed similar sentiments, where they prioritised the needs of their staff members above their own and accepted the burdens of the staff while quietly managing their own emotions.

3.3.3 Theme 3: Managerial Growth Amidst the Pandemic

The DRMMs shared that their experiences as managers during the COVID-19 pandemic contributed to significant improvements in their managerial skills. They reported that their interpersonal relationships with their teams, as well as hospital colleagues, were improved. DRMMs highlighted that the challenges they faced, helped them to build resilience, adaptability, strong leadership and interdisciplinary engagement skills. Additionally, they expressed that their experiences during the COVID-19 pandemic contributed to their growth as managers in the radiography departments.

3.3.3.1 Category 3.1: Fostering Teamwork and Collaboration

Several DRMMs in this study expressed that teamwork among staff members during the pandemic was at its best. DRMMs shared that staff members worked together more closely and ensured everyone, especially junior staff, followed the protocols. DRMMs mentioned how they witnessed senior team members being proactive and showing leadership skills by providing support to junior staff members. The DRMM team also had brainstorming sessions, WhatsApp group chats and regular online meetings where they could seek guidance from one another, be vulnerable, and learn from one another. A few DRMM responses were:

M5: "At the beginning of the COVID pandemic, my team was very fractured, but we had to rely on each other, which helped us get our teamwork up and stronger. We were forced to build relationships because we were the only people we saw at the time. You couldn't go out and socialise, so our work, for us work was our social time.

And even though we were still isolating and wearing masks and trying to stay away from each other, teamwork had been at an all-time high during the pandemic."

M4: "I think the pandemic made the staff work better as a team as well because they came together to make sure that they were safe as well, as well as making sure that their colleagues were doing the right things, the junior staff were following protocols, so it brought a lot of people more responsibilities, gave them added responsibilities in their roles.

M9: "What came out positive for me was the fact that as a team we tackled it together. Although we had the fear. Although we had the uncertainty, we tackled it together with everyone on-board, the team spirit was there, looking, you know, having each other's backs and making sure are you okay, are the other one okay. So that – that was a big positive that came out for me although it was an uncertain time we really, you know, jumped into it together."
M3: "Before we were segregated, we had rads [radiographers] on a group [WhatsApp group], we had reception on a [WhatsApp] group, but the Covid [WhatsApp] group is actually the all-staff group.

M3: "The reality of it is that we got through it because of being able to rely on your own group of your team and also, you know, just your other managers, your other fellow managers that were in the same struggle.

M9: "As a team of middle managers we could brainstorm and we could put ideas to the table and during the Teams meetings and the check-ins that we had it really gave me the platform to assess where I am personally within my department, where do I have any shortcomings and from that platform, so that was a great coping mechanism"

Zervides et al. (2020: 5) emphasised that addressing communication, collaboration, and education is crucial during a challenging pandemic period. Tay et al. (2020: 471) also shared that the feedback managers received from staff members was helpful to

collate and address suggestions, further promoting teamwork. Udod et al. (2020: 1) explained that positive work relations with others are important in the context of change in the workplace. Sim et al. (2020: e310) highlighted the significance of establishing transparent and easily accessible communication channels to disseminate instructions to all staff members. The DRMMs in the current study similarly found that communication channels during the pandemic not only promoted information sharing among staff members but also served as a platform for peer support.

Tam et al. (2021:15) reported that healthcare providers in supportive working environments were inclined to demonstrate greater coping strategies when facing a public health emergency like the COVID-19 pandemic. Their study highlighted that sufficient institutional support assisted healthcare providers in adopting coping strategies rather than being overwhelmed by COVID-19 stressors. Similarly, therapeutic and diagnostic radiography managers in the study by Flood et al. (2022: S32) expressed great pride in their radiography teams, emphasising that a resilient and cohesive staff team made a huge difference to their own mental health. These managers indicated that radiographers who supported each other during the pandemic are very close with strong bonds. The views from the literature are in line with the experiences of DRMMs, who also felt that the pandemic facilitated great teamwork and cohesion in their departments. They also mentioned that regular engagements with their teams encouraged staff members to bring meaningful suggestions to the fore.

3.3.3.2 Category 3.2: Interdisciplinary Support

In this category, it was established that the DRMMs had to engage and rely on several role-players in the hospital. As the COVID-19 pandemic was new to everyone, it was important for DRMMs to stay up to date with current information about the virus in the form of meetings and training. The radiology practice where the study was conducted operates across multiple hospital groups; therefore, DRMMs were required to engage regularly with other healthcare professionals and hospital staff. DRMMs indicated that

they received great support from the staff members at the different hospital groups, with some DRMMs being included in the hospital response teams and disaster management teams, which was new to DRMMs, as they were not previously included in hospital strategic planning meetings. Additionally, DRMMs had more regular interaction with nursing staff related to training support and compliance checks. The following direct quotations extracted from the participant transcripts relate to their experiences:

M8: "For the first time, you had weekly meetings with the hospital management about what was going on during the pandemic, what they implemented on their side, and what protocols we implemented. We had a focus group, part of the actual disaster management team, and I was included in that group."

M11: "Also there were regular occupational health and safety meetings which I had to attend. The Covid task team, which I had to attend once a week.
M2: "The infection control nurse in the hospital was also very good in terms of making sure that once in two weeks or in three weeks, the hospital conducted meetings, just to check in and also to share experiences"

M9: "I also had to have regular check-ins with the infection control sister of the hospital and had to arrange a hand hygiene workshop with her. She visited the branch, and then in our CT department, we had an area where staff had a hands-on workshop on hand hygiene and what is expected"

The healthcare managers in a study by Uvhagen et al. (2024: 363) stated that they recognised more than before that to give adequate care for all patients, the whole healthcare system needed to work 'as one', instead of in 'silos'. This led to a feeling of common purpose, a newfound respect and knowledge of collaborating partners, as well as an increased understanding of the work and responsibilities of different services. The nurse manager participants in the study by Vázquez-Calatayud et al. (2021: 86), upon reflecting on experiences during the pandemic, pointed out that nursing teams were more unified than ever. This unity resulted in providing mutual

support among nurses, as well as teamwork playing an important role in ensuring the quality of patient care.

As described by Nembhard et al. (2020: 4), when facing novel circumstances, organisations thrive by leveraging both internal and external relationships. Nembhard et al. (2020: 3) indicated that the COVID-19 pandemic required teams to develop relational coordination by having accurate, frequent, timely and problem-solving communications. The authors explained that relational coordination is achieved through shared meetings and protocols as well as shared conflict resolution strategies. These types of interactions seemed to have been quite meaningful in the current study.

Chen et al. (2020: 4964) explained that their radiology department in Singapore formed part of a large academic tertiary medical centre, and they formed a task force to have clear modes of communication and leadership to ensure the safety of their patients and staff members. The authors explained that the radiology division of the task force served as a point of contact for the hospital-wide disease outbreak task force, and they had different modes of direct communication between the task force and the ground staff, which allowed for instant messaging applications, dissemination of information for speedy action to be taken and allowed real-time clarification.

The DRMMs of this study expressed receiving support from the various hospital staff through inclusion in the hospital disaster task force teams, regular infection control meetings and regular contact with relevant hospital stakeholders.

3.3.3.3 Category 3.3: Personal and Professional Growth

The DRMMs shared that their experiences during the coronavirus pandemic brought about meaningful changes in how they view themselves, and their roles within the workplace. They felt they made significant improvements in their management capabilities, particularly in areas such as communication skills, decision-making,

working under pressure, resilience, adaptability and an understanding of crisis management. They indicated that they had to be resourceful and find out information on their own, contributing to their overall personal development during that period. Some of the experiences they highlighted during the interviews were:

M9: "I developed a deeper sense of endurance that also made me grow on another level of management. I can also say that my sense of discernment has also enhanced, where I can now see further than just the smile of an employee. Because sometimes they hide behind their smiles, but this pandemic also taught me to look further than just that smile.

M5: "The biggest impact that it had on me was the people aspect. I picked up such amazing skills of listening with understanding and not interrupting people when they talk and just letting them speak".

M8: "... during that time, it was all about communication with the staff. But you also had to have the correct information, and research about what was happening around you."

M3: "We were stretched in that period. It was a lot of unknowns for us; I mean, that was unchartered territory for us as middle managers. Even the way we are now communicating, Zooming and Teams meetings. So that in itself is something that we have learnt. That's new. A lot of what we're doing now is on Teams. A lot of our spreadsheets and all sorts of things are on Teams."

M7: "I think that also me being resilient and keep on going and not giving up when I fell that I want to give up but, I think it has made me stronger, a stronger person than that I was before I got this position. A lot of growth."

Ivaniuk et al. (2020: 80) consider self-development as the act of deliberately shaping and developing one's own physical and moral strength and self-realising new

knowledge and skills. Self-development, as interpreted by the authors, is characterised by self-progress, which is driven by one's own professional growth motives. During COVID-19, leaders had to adapt to new environments that affected the emotional behaviours of themselves and their employees (Mercedes and Burrel, 2022: 195). The therapeutic and diagnostic radiography managers in the study by Flood et al. (2022: S33) reported that during the pandemic, they learnt that they needed to be more proactive than ever to communicate their appreciation directly to their staff members.

Tay et al. (2020: 473) explained that one component of effective leadership during the COVID-19 pandemic was ensuring that the staff members did not become complacent when it appeared that the crisis was under control. Tay et al. (2020: 473) stated that an interesting outcome that has surfaced from the COVID-19 crisis was the opportunity to identify colleagues/subordinates with an interest in leadership and management. The authors elaborated that a crisis of this dimension was a unique opportunity to identify, groom and nurture younger talent for future leadership roles. As also stated by Everly Jr et al. (2020: 768), leaders are reminded that people trust actions and not words, and therefore, leaders must demonstrate and model effective actions by practising the behaviours they prescribe and following through on doing what they say they will do. Udod et al. (2024: 2) agreed that a leader's behaviour can directly impact staff, quality of patient care and an organisation's performance. It is therefore imperative for managers and leaders to understand that their behaviour and attitude towards a situation, even during a crisis period such as a pandemic can influence the behaviour of their teams and the success of their departments.

Upon reflecting on their experiences during the COVID-19 crisis, nursing managers learnt new skills related to information technology, decision-making and identifying organisational and managerial models and, above all, were left with a feeling that they had grown as managers (Leppäkoski et al., 2023:4193). Similarly, in the current study, the DRMMs shared growth developments, particularly people skills such as learning how to listen to their employees with understanding, communicating constantly and

honestly, educating themselves on the unknown topic of COVID-19, as well as skills development to assist in their administrative role as managers.

3.4 Chapter Summary

DRMMs, in this study, played an important role in the daily management of the radiology departments to ensure an efficient and effective imaging service during the height of the COVID-19 pandemic. In this chapter, the various themes of adapting to change, challenging environment and managerial growth amidst the pandemic that developed during data analysis were discussed, and verbatim quotes from participants were shared. The many operational management considerations that DRMMs had to consider and adapt to in organising services whilst adhering to all the public health guidelines and safety protocols were discussed. The next chapter will concentrate on offering guidelines and recommendations to future DRMMs to navigate a crisis period similar in scale to the COVID-19 pandemic.

CHAPTER 4

GUIDELINES, CONCLUSION, LIMITATIONS, RECOMMENDATIONS

4.1 Introduction

In Chapter 3, the research findings and their discussions were presented. Chapter 4 offers guidelines and recommendations based on the categories and themes discussed in Chapter 3. According to Kredo et al. (2016:123) a guideline is an efficient method of consolidating evidence and presenting recommendations to healthcare decision-makers, aimed at enhancing effectiveness and quality of care, reducing variability in clinical practice, and minimising costly and preventable errors and adverse events.

The guidelines and recommendations are aimed at supporting DRMMs who may in future be faced with a similar pandemic or crisis period of a comparable magnitude.

Table 4.1 depicts the themes presented in Chapter 3 alongside the corresponding guidelines. These guidelines pertain to the introduction of a crisis management manual, establishing an employee well-being system, and providing crisis management and professional development training to DRMMs.

TABLE 4.1: THEMES AND GUIDELINES

Themes	**Guidelines**
1. Adapting to change	Guideline 1: Introduce a crisis management guideline manual. • Establish channels to communicate policies/ operations related matters to teams. • Navigate chance through transformative leadership.

	• Implement ongoing managerial education and staff compliance checks.
2. Challenging environment	Guideline 2: Establish an employee well-being system. • Provide access to employee mental health support programs. • Provide guided financial wellness planning sessions. • Cultivate a cohesive team environment
3. Managerial Growth amidst the pandemic	Guideline 3: Provide crisis management and professional development training. • Share best practices for handling pandemic situations. • Establish regular interdisciplinary team meetings. • Encourage reflective and debriefing sessions.

4.2 Theme 1: Adapting to Change

4.2.1 Guidelines 1: Introduce a Crisis Management Manual

This guideline was derived from theme 1, and it proposes the introduction of a crisis management manual. DRMMs had the task of communicating various new protocols and guidelines via email to ensure staff remained informed. They indicated they were expected to implement all the newly communicated guidelines and had nothing at hand to refer to. This included training sessions on how equipment cleaning must be done, how imaging COVID-19 infected patients was performed and how hand washing sessions had to be conducted. They had to navigate through the challenges of the

pandemic while working to make this happen. By having a crisis management manual available in the radiology department, future DRMMs will have guidelines on the important aspects and how to implement them. The WHO Health Emergency and Disaster Risk Management Framework report (2023:10) advised that it is important that information collection, analysis and dissemination be harmonised and mechanisms put in place to ensure that "the right information gets to the right people at the right time" across relevant sectors.

The researcher, therefore, proposes that, as part of the induction process for all employees, the crisis management manual be formally introduced by relevant practice/department management to all radiology staff members. Furthermore, it should be accessible on the radiology practice intranet, where staff members can readily access it. The availability of this manual will allow all radiology staff members to familiarise themselves with the department's procedures, policies and protocols, promoting preparedness during a crisis period.
Suggestions to achieve this guideline are provided below:

4.2.1.1 Establish Channels to Communicate Policies/Operations-related Matters to Teams

At the onset of the pandemic, DRMMs in this study recognised the critical need for clear, honest and timely communication with their teams. They emphasised the importance of ensuring that staff members fully understood their roles and responsibilities and consistently adhered to newly implemented protocols. Effective communication is therefore essential to maintain trust, reduce anxiety and ensure compliance during a rapidly evolving crisis.

As discussed by Roytman and Shah (2020:90), due to the rapidly evolving situation and associated uncertainties of the pandemic, their department prioritised maintaining an open forum for communication as well as transparency of the circumstances. The authors also suggest the utilisation of group chat-based messaging platforms like WhatsApp messaging service to disseminate critical information quickly. Wong et al

(2020:164) agreed that, among other things, efficient communication and rigorous staff surveillance are vital to ensure patient and staff safety during a pandemic. Rajan (2019:77) suggested that communication structures should be strengthened to assist supervisors at times of crisis and other emergencies. Roytman and Shah (2020:90) advocate for the introduction of an annual lecture-based communication curriculum where faculty and trainees participate in communication workshops, including small-group and peer-led sessions, to help faculty and trainees develop tools for expressing empathy and dealing with difficult situations specific to radiology.

Participants of this study expressed that they had to educate staff to diligently check and read emails and to ensure they always had mobile data available. Communication was primarily conducted via email, supported by virtual meetings conducted via the Teams platform. The WhatsApp messaging platform was also used for communicating time-sensitive information. Recognising the value of these alternative communication methods, particularly when in-person engagements are not possible, the researcher recommends that digital communication methods be integrated into departmental operations. It is further recommended that the use of such digital platforms be made compulsory, with regular, important reminders sent electronically to establish consistent communication with staff members.

4.2.1.2 Navigate Change Through Transformative Leadership

Based on the responses of the DRMMs, they were required to implement quick modifications to operational workflows and reallocate resources as needed. Achieving this, DRMMs required not only the cooperation and commitment of their teams but also foresight to prepare for unforeseen challenges. Such proactive planning was essential in improving organisational adaptability and empowering teams to navigate unpredictable situations within their departments.

Swift operational strategies were required at the private radiology practice, which is in line with findings of available research. Chan et al. (2021: 350) stated that at the start of the COVID-19 pandemic, administrators in their study had to quickly develop strategies to manage the increase in patient volumes. As described by Everly Jr et al.

(2020: 768), in times of crises, leaders can create or stabilise routines by scheduling daily briefings to provide updates on any new information. The authors elaborated that this can be done at the beginning or the end of each shift or operating period, and daily updates can also be provided electronically. Kolbe and Broos (2019: 2) described reflection and learning in post-event clinical debriefings as an important aspect to contribute to effective teamwork in healthcare. Roytman and Shah (2020: 93) advised on the importance of involving teams in any decision-making process. The authors believe this will contribute to and encourage a culture of open communication and transparency, which will lead to departmental success. Gurr and Drysdale (2020: 25) suggested that effective leadership entails providing clear guidance while remaining flexible enough to accommodate changes in the environment. According to Gurr and Drysdale (2020: 25), leaders with a responsive leadership orientation are potentially well-suited to navigate the short-term and long-term effects of unexpected occurrences.

Nembhard et al. (2020: 1) also reiterated the necessity for healthcare organisations to organise the workforce to work in new ways almost daily to respond to the growing concerns of the pandemic, amidst staff and supply shortages. Hence, the need for debriefings and combined reflections in departments before and after a shift during crisis periods is recommended. The researcher proposes that DRMMs adopts an agile leadership style to foster a culture of perpetual learning and maintain employee engagement in departmental responsibilities by constantly drawing the learnings from past events through the debriefing sessions. Furthermore, the researcher proposes that dedicated workshops or training sessions be conducted biannually to familiarise and update DRMMs and staff with the crisis management protocols. This can be achieved by organising in-person workshops or virtual online sessions, which can also be recorded with the consent of attendees for future reference.

4.2.1.3 Implement Ongoing Managerial Education and Staff Compliance Checks

Initially, DRMMs felt that they could not plan and felt out of control. They explained that after they educated themselves about the infection control measures of the virus

and understood the situation better, they realised that with careful planning for different scenarios and staff education, they could manage unexpected situations more effectively.

The DRMMs facilitated staff service planning, which aimed to cover the different modalities in each of the split teams. Shift overlaps were done in such a way that different teams, as far as possible, did not come into physical contact with one another, to prevent infecting one another. Departmental guidelines and newly developed protocols were communicated to staff members, and as part of the crisis management training, DRMMs in this study had to create a guide on performing the CT examination. Therefore, it was established that there would be a clean radiographer, meaning that the individual would not go into the room at all, and there would be the "dirty" radiographer, who would wear all required PPE and would interact with the patient until the examination was completed. Some other changes for newly developed standard operating procedures were to have dedicated cubicles for COVID-positive or suspected COVID-infected patients.

Chan et al. (2021: 350) stated that effective management and control of the COVID-19 virus depend on all departmental staff fully complying with established procedures for infection control. Furthermore, the authors asserted that it is crucial to prioritise the provision of sufficient equipment as well as to offer appropriate administrative support to frontline healthcare workers. Yan et al. (2020: 33) stated that all radiology department staff (including radiologists, technicians, nurses, front-line counter staff and cleaners) should have up-to-date knowledge and standardised operating procedures to minimise hospital-related infection transmission by personnel or by radiology equipment. The authors stated that the department should be divided into contaminated, potentially contaminated and clean zones.

The researcher recognises the importance of staff members staying up to date with the radiology department's standard operating procedures and proposes that regular self-assessments be distributed to staff to test their knowledge of the crisis

management protocols. DRMMs can achieve this by utilising applications such as the Google Forms platform, where digital online knowledge assessments can be conducted with staff members to regularly test their knowledge as part of compliance checks. This can be an ongoing process as new information emerges and is updated in the crisis management manual and can be seen as a proactive approach to keeping staff members engaged and prepared for crisis periods like the COVID-19 pandemic.

4.3 Theme 2: Challenging Environment

4.3.1 Guideline 2: Establish a Departmental Employee Well-being System

With the development of theme 2, the researcher acknowledged the accounts of DRMMs regarding their experiences of the ever-changing environment in which they had found themselves. Participants highlighted the different roles they had to play, which included managing staff members' physical and emotional well-being, implementing new health and safety protocols and ensuring the continuation of imaging services. Amidst these demands, they had to adapt to the constantly changing environment, often with limited guidance. DRMMs reflected on how these responsibilities weighed heavily on them as they knew staff depended on them for support and guidance. They further reflected on how their reactions to situations influenced how staff members adapted to the challenging environment, hence the reason they felt the need to hide their emotions.

4.3.1.1 Provide Access to Employee Mental Health Support Programs

Radiographers experienced patient deaths every day, and their fears and anxiety were evident as they feared for not only their own safety but also that of their families. DRMMs assumed the additional responsibility of providing emotional support, guiding and motivating staff members who were grappling with fear, anxiety, and the daily trauma of working on the frontline of the pandemic.

The implementation of a psychological support structure is a critical component in effectively managing staff members during a crisis period as the COVID-19 pandemic or similar future pandemics. Everly Jr et al. (2020: 768) accentuated that information is the antidote for anxiety, and, therefore, managers and leaders should foster the dissemination of relevant information to staff members. This includes anticipatory guidance, clarifying insights and prescriptive recommendations whenever practical. The authors further elaborated that psychological support could be achieved by explaining to employees what happened, the causes of why something happened and the actions being taken to remedy the situation to prevent or prepare for similar future situations.

England et al. (2020: 1145) conducted a study in which they found that faculty leaders must be hypervigilant to investigate any suspicion of depression and stress among radiology residents. The authors stressed that mental health and wellness resources should be reiterated and circulated to all radiology residents. Similarly, Akudjedu et al. (2020: 9) explained that radiology departments should seek to mitigate the impact of a pandemic on their workforce through consistent communication, ongoing education, and provision of clear IPC guidance and PPE, as well as strengthen institutional structures for the management of workplace-related stress in readiness for future pandemics.

Key steps in developing strategies for implementing priority actions should include components for health security, mental health and disease surveillance to address prevention, emergency preparedness, response and recovery (The WHO Health Emergency and Disaster Risk Management Framework report, 2023: 12). Mental health programs are regarded as an important aspect in supporting employees during pandemic periods, a view echoed by Udod et al. (2024: 2) who emphasises that effective crisis leaders should create psychological safety by being empathetic to how people react to loss and uncertainty and enable individuals to cope and recover from a health-related crisis. Tran et al. (2020: 44) suggest that being understanding and empathetic to employees' challenges is another effective way leaders demonstrate the

employee-centred approach to human resources management. The author further claims that when employees feel safe and supported, they can grow, learn and thrive (Tran et al. 2020:44).

As mentioned by DRMMs, a mental health wellness program during the pandemic was not available, therefore, they served as the contact person for staff members to share their emotions and experiences with. Providing all employees access to a mental health support program would alleviate the need for DRMMs to adopt this role without the necessary experience and training. This should be provided by an external service provider to enhance trust and privacy. The information of the wellness councillor should be visible in the department, break rooms and practice intranet for easy access to employees and to eliminate the societal stigma of utilising these services. Employees should be allowed to utilise this service when needed and without expense incurred to them. Such programs will also be beneficial in helping DRMMs address their own fears and uncertainties they face when managing and leading a diagnostic radiography department during a pandemic.

4.3.1.2 Provide Guided Financial Wellness Planning Sessions

DRMMs indicated that due to the financial cost-cutting measures taken by their radiology practice, salaries were cut, and unpaid leave days were enforced. Middle managers were tasked to communicate this information to staff, and the data revealed that stress was observed among the staff. O'Doherty et al. (2020: 6) advised that shifting priorities for funding in response to the COVID-19 pandemic, such as suspension of near-future funding cycles, cancellation of events/ meetings (or moving meetings online) and freezing of staff hiring, are all major considerations that will have to be considered when faced with a future pandemic.

The WHO Health Emergency and Disaster Risk Management Framework report (2023:10) states that it is important to have adequate financial allocations, including prevention and preparedness measures, in place to be allocated to the safety and security of populations. This report further states that financial mechanisms should also include contingency funding for response and recovery. The report elaborates

that for advocacy and planning purposes, it is important to estimate the costs for future potential emergencies and disasters as well as to document the economic impacts of past disasters on health and the health system (WHO Health Emergency and Disaster Risk Management Framework report, 2023:10).

Offering financial tutorials about unpredictable situations may benefit staff members, many of whom may be unprepared for the financial implications of the situation. Smith and Friedman (2020: 10) assert that encouraging employees to establish an emergency financial fund is crucial for preparing for unprecedented times. They also recommend consultation sessions for employees, focussing on the structuring of employee benefit packages to assist during crisis periods. Anaebere et al. (2024: 12) found that financial stressors such as debt management and investment options are concerning to physician trainees, and that a comprehensive personal finance course can help alleviate some of these trepidations. The authors further recommended that, to maintain persistent financial confidence, frequent and consistent financial education would be beneficial in the long term (Anaebere et al. 2024:12). The researcher, based on the literature, inferred that employees, amidst crisis periods, should be provided with proactive financial information sessions from financial advisors to give employees an understanding of the financial situation in the economic climate of the country. This can be presented in the form of in-person or via online virtual platforms, in a group setting where general information can be provided followed by questions and answers. These sessions can be followed up with one-on-one consultations if an employee wants more financial guidance. The financial wellness planning sessions could assist in preparing and educating all staff members on their own financial planning for unpredictable circumstances such as the COVID-19 pandemic, alleviating strain to cope better emotionally during such difficult times.

4.3.1.3 Cultivate a Cohesive Team Environment

Dealing with a pandemic of this magnitude in the radiology department required not only maintaining service delivery but also protecting radiographers both physically and emotionally. Although some DRMMs felt that top management could have supported them more during the pandemic, the majority of the participants conveyed a strong

sense of being supported by top management of their practice, their hospital response teams, as well as radiographers in their immediate teams. This suggested a deeper feeling of unity and cohesion with the management team, multidisciplinary teams and radiology practice staff members.

An overwhelming standout point was the support DRMMs expressed that they found in each other. They mentioned looking forward to their daily Teams platform meetings where they could vent, seek advice and just share experiences. They mentioned finding comfort in the shared experiences and felt at ease phoning a fellow DRMM for advice or guidance on a scenario. DRMMs found comfort in talking to fellow DRMMs, by doing research and educating themselves on this pandemic and having as much information as possible to help them cope with the unknown at the time.

A study by Udod et al. (2024: 9) found that there was a recognised need for mutual support within and among managers, multidisciplinary teams and services to engage in new work processes and clarify potential misinformation in working together. Tran et al. (2020:44) mentioned that when a leader uses human-centred practices, employees feel respected and calmer. This creates an environment where they experience less stress and worry. Everly Jr et al. (2020: 768) advised leaders to listen more effectively by allowing staff members to express their personal and professional concerns. The authors also reiterated that trust builds relationships and, therefore, it is essential for leaders to preserve credibility by applying transparent, timely and truthful communication. It is therefore recommended that structured peer support mechanisms be facilitated, such as regular virtual check-ins or discussion forums for DRMMs to share experiences, seek guidance and access emotional support during times of crisis or future pandemics. DRMMs can also introduce structured peer-to-peer discussions where staff members can be randomly paired with a colleague and where they must provide supportive, positive feedback and observations about each other. The researcher believes that such an initiative will cultivate a culture of trust, foster teamwork and promote positive interpersonal relationships among colleagues.

4.4 Theme 3: Managerial Growth Amidst the Pandemic

4.4.1 Guideline 3: Provide Crisis Management and Professional Development Training

This guideline was developed because DRMMs expressed the need for coordinating and communicating with their various hospital groups, as the patient management flow had to coincide with hospital protocols to prevent unnecessary cross-contamination. This had to be carefully planned so that the patients were swiftly transported into the radiology department, received the necessary imaging and were transported back to the hospital ward. Furthermore, DRMMs revealed that they needed to research the COVID-19 pandemic to educate themselves and to have as much information as possible available to help them cope and to keep their teams updated. Proactive coping strategies, such as professional and personal development, became necessary to cope under these circumstances. DRMMs would therefore benefit from having regular learning opportunities and proactive professional and personal training.

4.4.1.1 Share Best Practices for Handling Pandemic Situations

It is advised by Everly Jr et al. (2020:768) that leaders should check in with staff members frequently, inform them about the availability of community resources, and encourage them to use all available community channels. Everly Jr et al. (2020:768) advised that the best predictor of resilience is interpersonal support, and therefore, managers or leaders should be visible by "walking among their troops" and informally monitoring the psychological pulse of those they lead. The authors further stated that managers and leaders should get training in the basic principles of "psychological first aid". Tay et al. (2020:469) stressed that as an epidemic unfolds, leadership with foresight is important to anticipate potential issues, manage issues that arise or prevent them from escalating. As explained by Kolbe and Broos (2019: 4), teams can learn best when they reflect on their team and task work by sharing expertise, problem-solving and decision-making procedures that fit task requirements. The study of O'Doherty et al. (2020: 6) advised institutions to adopt and share leadership

techniques to assist in future pandemics, such as advocating clear and concise communication of necessary information, gratitude for front-line staff members and maintaining an attitude of compassion for personnel during this stressful time. Everly Jr et al. (2020: 768) agreed that stress and challenges are better tolerated by cohesive groups than by non-cohesive groups. England et al. (2020: 1145) suggested that short daily “virtual huddles” allowed all residents to hear updates, pose questions and make suggestions, which empowered the trainees and were beneficial to programme directors to fully understand resident concerns.

The WHO Health Emergency and Disaster Risk Management Framework report (2023: 8) recommend awareness about practices, policies, plans and services related to health functions. There is, therefore, a need for DRMMs to be equipped with leadership and management skills to lead and guide their teams. Roytman and Shah (2020: 92) highlight the importance of such skills and facilitating open discussions serving as a therapeutic tool for all staff members. The data revealed that some DRMMs utilised their senior staff members to guide junior staff members with adherence and implemented team leaders in each work group to support and ensure correct protocols were followed. They developed a custom of doing walkabouts through their departments at various intervals during the day to spot-check that social distancing was adhered to, cleaning was done, and imaging protocols were followed. To assist DRMMs with leadership strategies during a pandemic, they could be provided with leadership and crisis management training, as some DRMMs mentioned that they had to roster themselves on the staff rotation roster as a reserve person, but that it was taxing on them as they were at work all the time.

DRMMs also mentioned how they had to learn how to conduct virtual online meetings and use an Excel spreadsheet as they had to document data. These practices can be taught to DRMMs in training sessions by professional instructors. DRMMs mentioned they found the most support from fellow DRMMs and that their guidance assisted them with decision-making and leading their teams during this period. They shared that conversations and meetings with peers helped them cope and apply workable

methods in their own teams, and they could ask for guidance from their fellow DRMMs if they struggled with complicated situations. Structured best practice meetings and workshops can be established to provide DRMMs with dedicated sessions to share experiences, seek guidance on challenging situations, and learn from one another.

4.4.1.2 Establish Regular Interdisciplinary Team Meetings

The participants of this study found great support within their hospital teams and appreciated the interaction and collaboration, which did not exist before the pandemic started. DRMMs communicated that being part of regular hospital meetings with the various departments within their respective hospitals established an understanding between the radiology department and external hospital departments.

Yan et al. (2020: 33) stated that with the sharply increasing demand for CT examinations during the pandemic, radiology departments were high-risk sites for cross-infection; therefore, the implementation of standardised infection control and prevention practices in radiology departments was critically important. Chan et al. (2021: 350) described defining safe and unsafe zones within the department, designating certain equipment for use on infected patients only, predetermining safe transfer routes between a patient's room and the radiology department, and imaging infected patients within a set time window only as some of the successes of radiology departments. Tay et al. (2020: 469) mentioned that radiology departments in Singapore were part of a larger preparedness and response department that regularly conducted meetings so that pertinent policies and standard operating procedures were formulated, updated and shared.

As identified in a scoping review on hospital managers' competencies, Ndayishimiye et al. (2023: 06) found that hospital managers and experts who participated in their study emphasised the need for a stronger focus on collaboration with different stakeholders. This aligns with the WHO Health Emergency and Disaster Risk Management Framework report (2023: 7), which advocates for multisectoral and

multidisciplinary collaboration, underscoring the need to effectively manage the risks that emergencies pose to human health. Similarly, the report by Mossa-Basha et al. (2020: E26) stated that during the COVID-19 pandemic, it was vital for radiology departments to partner with the emergency operations teams in healthcare facilities for planning and coordinating diagnostic procedures, patient management and management of patient surges. As recommended by the WHO Health Emergency and Disaster Risk Management Framework report (2023: 16), multisectoral coordination mechanisms are important to bring together all local agencies and organisations that can serve as a central point for cross-agency cooperation to minimise health risks and consequences of disasters and emergencies.

The regular interactions between DRMMs and hospital departments led to greater tolerance of one another in handling difficult situations. It fostered meaningful working relationships and created a sense of harmony that could potentially filter down to the different teams. A recommendation would be that DRMMs should participate in interdisciplinary team meetings and collaborations to form meaningful relationships with other teams in their hospitals. DRMMs can also provide interdisciplinary teams with presentations about radiography, to provide hospital staff members with insights into radiography operations and important radiography protocols.

4.4.1.3 Encourage Reflective and Debriefing Sessions

DRMMs reported that the pandemic offered valuable learning opportunities. Through reflection, DRMMs acknowledged the necessity for staying informed about evolving guidelines and best practices, through collaborations and group reflections to support their staff during periods of uncertainty.

DRMMs reflected on the dedication and commitment each staff member played in ensuring that all established protocols were implemented successfully and followed consistently. They also reflected on their own behaviour and how they realised early in the pandemic the impact they had on their staff. If they projected a positive and confident attitude in dealing with the COVID-19 patients and the changing

environment, their staff adopted that attitude. As described in Kolbe and Broos (2019: 3), clinical team debriefings are designed to promote learning from reflected experience, as these guided conversations simplify the understanding of the relationship between thought and feeling processes, events, actions, and team performance outcomes.

Helyer (2015: 16) claims that workers can develop their reflective skills by critically appraising what has been experienced via practice. The author further elaborates that reflection will enable them to improve their ongoing practice. Bajaba et al. (2021: 4) stated that managers with an adaptive personality are more likely to have the confidence to lead during a crisis as they are more likely to believe in their capacity to accurately assess the available information at the time of the crisis. The study by McFadden et al. (2022: S71) suggested that managers who engaged in reflection had a positive impact on their staff; however, they also noted that the time for reflective and brainstorming sessions was not prioritised. As described by the DRMMs of this study, reflection sessions would have allowed them to share their experiences with the group and learn from them in a more structured and calmer environment, unlike the chaotic COVID-19 period. Paulsen (2020:872) explained that when people are in a reflective mode, they can enrich or delimit their consciousness of the experience. The author further elaborates that people become conscious of their experiences by feeling them, telling stories about them, and constructing imaginary symbolic representations of the event that was experienced. The intentions of reflective thinking are to construct meaning, and when people are reflecting on an experience, they obtain insight by intuition and/or reason. DRMMs acknowledged that equally important was to reflect on the learnings and insights as opportunities for personal and professional growth. It is therefore recommended that regular, structured reflection and debriefing sessions be facilitated for DRMMs during and after major crises to facilitate shared learning, emotional processing and professional growth in a calm and supportive environment.

4.5 Conclusion

During this study, the various operations management factors that DRMMs faced during the COVID-19 pandemic were discussed, supported by verbatim quotations from semi-structured interviews, which provided insight into the experiences of these DRMMs. DRMMs had to navigate their way through many uncertainties and doubts in an ever-changing environment. The study revealed that during the pandemic, DRMMs had to regularly engage with their various hospital stakeholders for guidance and assistance. They also developed new abilities and skills, such as clear, frequent and honest communication with their employees and advanced technological capabilities. It would thus be beneficial for DRMMs to receive appropriate briefing and support to prepare for such expanded roles to minimise the strain caused by sudden role transitions. As supported by literature, Sim et al. (2020: e310) state that the ability to directly disseminate unfiltered instructions and words of encouragement to staff members is made possible by clear and open communication channels from a central command task force. Zervides et al. (2020: 5) additionally explain that communication, collaboration and education are key issues to be addressed during a challenging period such as the COVID-19 pandemic.

The researcher included an abstract from a manager interview (Appendix I) to provide the reader with an indication of the authenticity of the data. From the experiences of the DRMMs of this study, the recommended guidelines would be useful for sound management during crisis periods to safeguard radiology staff members against the impact of a pandemic. By having a clear vision and direction to guide and motivate teams, all managers can navigate through turbulent times.

4.6 Recommendations

From the data, it is proposed that certain adjustments need to happen in a diagnostic radiography department due to the inevitable circumstances of a pandemic. Key recommendations are:

- A crisis management document should be introduced in radiology departments to facilitate centralised communication channels, standard operating protocols, and support DRMMs in adopting new working methods.
- It is also strongly recommended and supported by literature that radiology departments should have an employee health and wellness programme in place to assist employees working on the frontlines of the pandemic, with emotional and psychological support.
- It is further recommended that future radiology middle managers nurture and establish professional work relationships with various interprofessional team members to enhance interdisciplinary support during a crisis period.
- A final recommendation is to provide DRMMs with opportunities for debriefing and reflective sessions, equipping them to effectively manage both their teams and themselves during challenging periods.

These guidelines and recommendations were developed from the unique circumstances DRMMs faced during the COVID-19 pandemic. The challenges required them to develop new strategies for communication, implement operational changes, and educate their teams effectively.

4.7 Study Limitations

A few limitations in the study are acknowledged.

- Participants: The study was conducted at one private diagnostic radiology practice. The study excluded all the other private practices in the study region. As a result, the findings may not reflect the broader experiences of DRMMs across the private and government sectors.
- Data collection: As the research site experienced scheduled and unscheduled electricity outages called load shedding, a few interviews had to be restarted due to power outage interruptions during the data collection process, which could have affected the thought process of a DRMM before being suddenly interrupted by the load shedding.
- Recall bias: This may have occurred due to the time gap between participants' experiences during the COVID-19 pandemic and the timing of the interviews.

- Generalisation: The findings of the study may not be fully generalisable to all DRMM experiences, as it assumes a shared set of experiences and challenges and does not account for individual exceptions.
- An independent coder was not used. The absence of an independent coder during data analysis may have introduced interpretation bias, as all coding and theme development were conducted solely by the primary researcher with verification and input from the study supervisors.

4.8 Personal Reflection

At the beginning of the level 5 national lockdown of the pandemic, I remember driving to work and for the first time since I could recall, I was the only car on a usually busy highway, which was very weird and sad. I felt like the end of the world was upon us, and I was driving towards a situation where I didn't know if I was going to be safe. Some mornings, I shed a tear and prayed to God for protection. After the lifting of mandatory mask-wearing during the COVID-19 period in our country and reflecting with colleagues, the idea of putting the experiences of all DRMMs on paper inspired me to pursue this research topic. I wanted to echo the bravery of the DRMMs who navigated many situations during the pandemic in the departments.

This research journey was tough and extremely challenging. Some days, I could not even type one sentence as navigating the challenges of family life, being a DRMM, a mother, doing school homework with my kids, and my studies became too much. Some days, I resented myself for starting it as it became too long, and I just wanted it to be over so I could feel less guilty if I was relaxing with the kids or watching a television programme. I am proud of myself for persevering, as I had many thoughts of giving up, especially over the last year. I'm relieved to have this as a memory and not on my to-do list. As I'm reaching the end, I'm feeling a sense of accomplishment, especially if I look at the many words on the whole document and know that it was many late nights, tired eyes and fingers that typed it. It has enriched my knowledge of research writing, vocabulary and improved my communication and listening skills.

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APPENDICES

Appendix A: Radiology Practice Permission Letter

[redacted]

Cape Town, 8001

Dear [redacted]

I am registered at the Cape Peninsula University of Technology for the Master of Science degree in Radiography with student number 198100302. In fulfilment of my studies, I am required to complete a research project. My proposed project title is: "***Experiences of Diagnostic Radiography Middle Managers working at a Private Radiology Practice during the COVID-19 pandemic."***

As part of data collection, online video conferencing semi-structured interviews will be conducted via the Zoom Communications Inc. platform with the Radiography Middle Managers of the various branches where your practice operates. I hereby request permission from [redacted] to approach middle managers to participate in the study. Participation will be voluntary, and no staff members will be coerced into participating. Participants will conduct the interview at a convenient time for them, and there will be no interference with their daily workload and daily responsibilities. Anonymity of participants will be ensured as no personal data will be required. All information will be kept confidential and in line with ethical standards. During the dissemination of study results, the name of the radiology practice will not be revealed.

I trust this request will be favourably considered. Please do not hesitate to contact me for any further information.

Sincerely,

Contact Nr.: 0720965852 E-mail : 258landy@gmail.com

Appendix B: Study Site Consent Letter

[redacted] [redacted]

17th August 2022

To whom it may concern,

This letter serves to confirm that permission has been granted to Yolanda le Roux-Arries to conduct her research in the [redacted] for her Masters Degree in Diagnostic Radiography.

Yours sincerely,

[redacted]

[redacted]

Appendix C: Participant Information Letter

Dear Participant.

I, Yolanda Le Roux-Arries, have registered at the Cape Peninsula University of Technology for the Master of Science degree in Radiography with student number 198100302. As part of the requirements to complete this degree, it is expected of me to complete a research project. My project title is: "***Experiences of Diagnostic Radiography Middle Managers working at a Private Radiology Practice during the Covid-19 pandemic."***

As the radiography middle managers who was employed at this radiology practice, I hereby request your participation in my research study. Please note:

- Your participation in this study is completely voluntary
- The Zoom Communications Inc. platform will be used to conduct the semi-structured interviews. Confidentiality will be ensured meaning I will not share your information or data with anyone except with my study supervisors.
- By clicking on the secure link below, you voluntarily agree to participate in this research study.
- To ensure anonymity, during data collection and data analysis the participants will only be referred to as M (Manager) with a numerical number, example M3.
- The interview will take approximately 25 - 60 minutes to complete
- Please answer all the questions in as much detail as possible

Should you experience any emotional responses while answering the questions and require emotional support, please contact the human resources department who will provide you with details of the external counsellors available to support staff members. Should you have any complaints in how this research study is conducted, you can contact the Faculty Research Coordinator, Dr Dirk Bester (besterd@cput.ac.za) or the chairperson of the Faculty Research Ethics Committee, Ms C Lackay (lackayc@cput.ac.za).

Thanking you in advance for taking the time to participate and assist in this regard.

Yolanda Le Roux-Arries

Contact nr : 072 096 5852 Email : 258landy@gmail.com

Appendix D: Participant Video Recording Consent Form

I, (participant)_____ hereby consent to be a participant in the research study of Yolanda Le Roux-Arries. I understand that the title of the research study is ***"Experiences of Diagnostic Radiography Middle Managers working at a Private Radiology Practice during the Covid-19 pandemic."***

I understand that the researcher, Yolanda Le Roux-Arries, will conduct the study in the form of semi-structured online interviews using the Zoom Communications Inc. platform and that my anonymity will be maintained. I hereby give consent for a video recording to be made and that the audio file can be used for research purposes.

I hereby give permission in the form of my signature below:

Signature: _____

Date: _____

Contact details of Researcher:

Mobile Nr: 072 0965 852

Email: 258landy@gmail.com

Appendix E: Interview Guide Questions

Thank you for your time and for having this interview with me. Thank you for sharing your perceptions, experiences, and feelings, with me today. As you already know, the research is about the Experiences of Diagnostic Radiography Middle Managers working at a Private Radiology Practice during the COVID-19 pandemic. If at any point during the interview, you need to quickly attend to something, please feel free to pause. Also, remember ,if you feel uncomfortable or do not want to participate anymore, you are welcome to stop. The interview will be video and audio recorded to assist with transcription. All transcriptions will be rendered anonymous before analysis, and you will not be identified. Please note that your name will not be used, and you will only be referred to as manager 1, 2, 3 or 4.

Q1: How many years have you been a qualified diagnostic radiographer?

1-5 years		6-10 years		11-15 years		16-20 years		20+ years	

Q2: How many years of experience do you have as a radiography middle manager?

Less than 5 years		More than 5 years, but less than 10 years		More than 10 years	

Q3: How many staff members do you manage in your department?

Between 1-10		Between 11-20		Between 21-30		More than 30	

Q4: Please describe how you managed or coped with your responsibilities at the start of the pandemic. Particularly reflect on your role during crisis management, operations management, additional responsibilities, workload, staffing matters and any other work-related experiences.

Q5: Reflecting on your role as a middle manager, please describe the experiences you may have had.

Q6: Please describe some of the measures you had to put in place in the radiology department in response to the pandemic. Please include issues from a staffing perspective as well as operations management factors.

Q7: What type of challenges (staff related and/ or operations related) did you experience as a middle manager during the Covid-19 pandemic?

Q8: What new work practices or policies were implemented during the pandemic that you had to manage? If any, please elaborate.

Q9: Please elaborate on your experiences in overcoming any challenges that you may have experienced as a middle manager.

Q10: Please describe any new practices such as protocols or policies that you had to implement during the pandemic. Please mention your role and experiences in implementing these measures.

Q11: Please describe some of the added responsibilities assigned to you during the Covid-19 pandemic.

Q12: Please explain how you managed the added responsibilities brought about by the pandemic. Specifically, elaborate on the coping strategies you used.

Q13: Please describe the type of support you received from top management that assisted you to fulfil your role as a middle manager.

Q14: Please describe the type of support you received from radiographers that assisted you to fulfil your role as a middle manager.

Q15: Please describe any new skills you acquired during the pandemic that you will continue to use as a middle manager going forward.

Q16: Please describe any personal and professional lessons you have learnt during the pandemic that could be of value to other middle managers in future. Thank you for your time and for sharing your experiences.

Appendix F: Confidentiality Agreement with Transcriber

Dear [redacted](Transcriber)

I am registered at the Cape Peninsula University of Technology for the Master of Science degree in Radiography with student number 198100302. In fulfilment of my studies, I am required to complete a research project. My proposed project title is: "***Experiences of Diagnostic Radiography Middle Managers working at a Private Radiology Practice during the COVID-19 Pandemic."***

As part of data collection, online Zoom Communications Inc. interviews were conducted with the radiography middle managers of the various branches where this private radiology practice operates. You will be provided with the audio recording file of these interviews. This letter requests that all the information related to this study be handled with strict confidentiality and that no information be shared with any other party other than the researcher.

Please note that by signing this agreement, you acknowledge adhering to protecting the information and data of all participants.

Thanking you in advance for assisting in this regard.

Yolanda Le Roux-Arries
Contact nr : 072 096 5852
Email : 258landy@gmail.com

Signed: … ……(transcriber)
Date: 26th June 2023

Appendix G: Letter From Research Ethics Committee

Cape Peninsula
University of Technology

HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HWS-REC)
Registration Number NHREC: REC- 230408-014

P.O. Box 1906 • Bellville 7535 South Africa
Symphony Road Bellville 7535
Tel: +27 21 959 6917
Email: sethn@cput.ac.za

31 July 2025
REC Approval Reference No:
CPUT/HWS-REC 2022/H13(Renewal)

Faculty of Health and Wellness Sciences

Dear Ms. Yolanda Le Roux- Arries - 198100302

Re: APPLICATION TO THE CPUT HWS-REC FOR ETHICS CLEARANCE

Approval was granted by the Health and Wellness Sciences-REC to **Ms. Y Le Roux -Arries** for ethical clearance. This approval is for research activities related to research for **Ms. Y Le Roux-Arries** at Cape Peninsula University of Technology.

TITLE: **Experiences of Diagnostic Radiography Middle Managers working at a Private Radiology Practice during the Covid-19 pandemic.**

Supervisor: Ms. V Daries and Ms. H Thomas

Comment:

Approval will not extend beyond 1 August 2026. An extension should be applied for 6 weeks before this expiry date should data collection and use/analysis of data, information and/or samples for this study continue beyond this date.

The investigator(s) should understand the ethical conditions under which they are authorized to carry out this study and they should be compliant to these conditions. It is required that the investigator(s) complete an **annual progress report** that should be submitted to the CPUT HWS-REC in December of that particular year, for the CPUT HWS-REC to be kept informed of the progress and of any problems you may have encountered.

Kind Regards

Dr. Shanel Raghubeer
Deputy Chairperson – Research Ethics Committee Faculty of Health and Wellness Sciences

Appendix H: Example of Field Notes

Example of field notes from interviews with participants.

Logistics:

The research was conducted using semi-structured interviews via the Zoom Communications Inc. platform. The online platform was preferred to remove factors like travel time to interview locations and financial expenses and to make it convenient for DRMMs. The participants were allowed to give the researcher a preferred date and time to conduct the interview. Some DRMMs had technical difficulty connecting at the beginning of the interview, like a sound that was muted but this was quickly resolved. Loadshedding also interrupted a few interviews and it had to be restarted after the switch over to back up electricity. The majority of participants preferred to leave their videos on for the duration of the interview. A few participants had to switch their cameras off in the middle of the interview due to poor connections.

Observations:

The researcher tried to set the participants at ease at the beginning of the video interview by first asking icebreaker questions like how their day was going and listening to a few scenarios DRMMs were willing to share. There were a few laughs and chit-chats, which the researcher could see calmed the participants a bit. After this, the researcher reminded the participants of the voluntary participation, that they could stop at any time and that she would be switching to “student mode” and start the interview and the recording. Once DRMMs started talking about their experiences during the pandemic, the information flowed freely, and they were visibly at ease sharing their experiences. Often, they would go back to a previous question as they remembered something as the interview progressed. The researcher was cognisant to separate herself from being a colleague and just to be a student conducting the interview; this was especially difficult with the first interview.

Personal Notes:

- When I started with the first interview, I was nervous as I didn't know how my colleague would react to being asked the questions of how they dealt with the pandemic as I did not want them to feel as if I was judging them.
- I found bracketing challenging at first, as I had to constantly remember that I only had to listen and not have or give an opinion to participants.
- I was nervous that I would not express myself clearly and understandably, but the advantage of the online platform was that I didn't have to fiddle with papers trying to remember a question.
- I could maintain eye contact and observe the body language of the participants
- By the third interview, I was comfortable.

Methodological Notes:

An exploratory, descriptive qualitative research approach was used which allowed the researcher to explore the participant experiences and clarify and confirm deeper meaning of answers from participants. This was also a form of member checking and avoided misunderstandings and provided clarity. The interviews were video and audio recorded for later transcription and analysis.

Theoretical Notes:

- DRMMs were on duty during the research study chosen period of between March 2020 and the end of April 2022 of the pandemic.
- At first, DRMMs were unsure of how to handle all the changes and protocol implementations coupled with the anxiety and fears of staff members.
- They feared for their own safety but realised they had to put those uncertainties aside as they had to manage the many operational changes in the department.
- In the beginning, they had to encourage, motivate and support radiographers when performing examinations of COVID-19 infected patients.
- There were constant protocol changes and new implementations.
- They had to handle radiography staff members who wanted to take unpaid leave due to fear and those who decided to resign from their positions.

- They had to educate staff members and to arrange infection control training sessions from hospital infection specialists.
- The lots of newly implemented protocols had to be monitored and DRMMs had to constantly check that it was followed correctly.
- DRMMs felt they had adequate support from top management and relevant hospital support teams, although a few felt top management could have supported them better.
- They felt they had the support of their senior staff members and involved them with protocol implementations.
- They felt great support in each other.
- They, however, felt that a debriefing session after the pandemic would have been beneficial.

Appendix I: Extract Example of Manager 1 Transcript

INTERVIEWER: Hi, thank you for taking this interview with me. As you know, my topic is the experiences of the diagnostic radiography middle managers, working at a private practice, radiology practice, during the COVID-19 pandemic. Thank you for sending me the consent form and consenting that this meeting can be recorded.

INTERVIEWEE: You're welcome, Yolanda.

INTERVIEWER: Okay, are you comfortable for us to start?

INTERVIEWEE: Yes, I am.

INTERVIEWER: [redacted]

INTERVIEWEE: [redacted]

INTERVIEWER: [redacted]

INTERVIEWEE: [redacted]

INTERVIEWER: [redacted]

INTERVIEWEE: [redacted]

INTERVIEWER: Please describe how you managed or coped with your responsibilities at the start of the pandemic, particularly reflect on your role during crisis management, operations management, additional responsibilities, workload, staffing matters and other work-related experiences.? You can talk we're just going

to have a nice conversation. You can just say, how you managed to get through the period.

INTERVIEWEE: I can't believe it's almost three years ago, the start of it. It was like the great unknown in the beginning. I still remember the first patient coming and everybody was freaking out. So with regards to like protocols and guidelines, higher management's and the help of the IPC sister, helped a lot with just getting those checklists. And then that helped me to create checklists to ensure that my department was then up to standard. Do I have the necessary hand sanitizers, the wipes to clean the machines, enough PPE for the staff to protect them and then also what to do and what not to do and how to do it. And then, the role was also to keep everybody calm because it's such an unknown, people tend to freak out a lot. So it was to keep calm, although there might be a storm raging inside of you. It was just to keep calm and be that security and constant for them. It was checking up on their mental health and their physical health to see if they are fit health- wise to do the job, so a lot of additional paperwork that came into play as well. We had to do these tick box exercises as well to see in which category they fall, high risk, low risk. Added duties, was tracking, so if someone came into contact, argh the endless paperwork of who was your first possible contact and how long were you in contact with that person, to then classify if you're going to go into isolation or not.

[redacted]

INTERVIEWER: I can just imagine all this happening in conjunction with all the fears that you, as a manager, also had for your health. How did you? Did you guys have any sort of mental programme? How did you, as a manager, deal with that in your own right in securing, like you said, you had to be the constant for your staff? How could you deal with that?

INTERVIEWEE: So, I would say, we're a group of middle managers and we get along quite well, so we would just vent off one another, how we feel, and what we needed to do and just by talking with someone else who goes through the same thing as you, really helped. And then, it was talking to my partner about it and just, talking to the other people that's maybe not always in the industry as well and then just seeking that guidance to understand the whole process more, also helped me.

INTERVIEWER: [redacted]

INTERVIEWEE: [redacted]

INTERVIEWER: That was a terrible period, yes. Please describe some of the measures you had to take in the radiology department in response to the pandemic. Please include issues from a staffing perspective as well as operations factors.

INTERVIEWEE: Staffing perspective, so because there was a stage where the radiographers couldn't take or didn't get remunerated for overtime work so they had to take the time off. So, how I approached that was, I split them into two groups, so that they don't ever or as far as possible, don't see, the two groups never cross-contaminate them. So, should one group get sick, there was always a healthy group, so the shift rotation was to try and minimise contacts as far as possible. I created a protocol for outpatients that they would come at a specific time into our department to

try and minimise contamination as well and that was setting up a protocol booking time specifically, this would happen after hours, so after five o'clock the patients would get specific timeslots, the doctors were all informed about this, and then this way the radiographers were also prepped to be ready in that specific time. The doors were all left open, patients were preloaded {onto the radiology information system} and the patient would literally just come in and go again. So that was one of the things I had to implement. Also, we did a lot of CT's because CT was like the gold standard, so also to try and minimise contact from like staff in general, like the receptionist who don't normally come into a lot of contact with the sick patients. So to protect them, we did a lot of CT's after hours as well. So it was also to create a guide or a protocol for the CT. Who's going to be the clean rad, not going into the room at all, and the other one has all the PPE on, not touching anything, literally just putting the patient on cannulating, taking the patient off, dealing with the patient itself.

INTERVIEWER: [redacted]

INTERVIEWEE: [redacted]

INTERVIEWER: And you obviously had to train yourself also to be able to teach them?

INTERVIEWEE:Yes. Yes, so a lot – we received a lot of guidance from the IPC nurse, like I mentioned earlier, so she would give us a lot of training. She would come to the department and help me out. So then I would also just sit in and train myself, as I had to be able to help them throughout this entire process.

INTERVIEWER: So, can you elaborate on the experiences in overcoming the challenges?

INTERVIEWEE: I think the majority would be to get the buy-in from the staff because without them, you will always have most of those challenges because they are the ones that need to help you get through it, they are the ones that need to participate in it, so the buy-in was definitely one of them. And it was also getting guidance from my peers, other HOD's, asking what they did and just by bouncing off ideas, you will get new ways how to do it and in that, you know, overcome what you are struggling with at the time.

INTERVIEWER: Yes. Thank you, can you describe to me any new practices, such as protocols or policies, that were implemented during the pandemic?

INTERVIEWEE: The temperature monitoring thing was a big thing. Cleaning, like extensive cleaning of the equipment, was required after each and every patient. Now we still do it, which is a good practice, you wipe off, but that was like mopping the floors, washing down the walls, it was just it's too much. Donning and doffing with COVID patients. So, specifically, how you put on your clothes, which comes first, the glove, then the gown, then this, then your goggles, then your mask, like take your fingers and you put them over, so all of that required a lot of training, and that was things we had to implement. The guidelines with when someone is contaminated, and your tracking, who was in contact and then working out the isolation and is it is really necessary to send them off. And then, we had to inform higher management about it.

INTERVIEWER: How did you manage that? What support did you get from top management?

INTERVIEWEE: We would have a weekly or maybe every second week, we would have a meeting to discuss how it goes. A lot of times, it was just implementation; we had to do it. I remember the one time they just did random observations in our

departments to see if we complied with everything, and then just emailed it to us. And I felt that they could hear us out a bit more. There were stages where there was a lot of support, but then there were also a lot of times where there was like no support. But a constant was always my colleagues, the other HOD's, like we would support one another because we all went through the same thing.

[AUDIO ENDS ABRUPTLY]

(M1 Nr 2)

INTERVIEWER: So, I think it was due to load shedding that we got disconnected, but we can continue.

INTERVIEWEE: No, that's fine. Maybe just repeat.

INTERVIEWER: [redacted]

INTERVIEWEE: [redacted]

[redacted]

INTERVIEWER: That is brilliant, so you delegated some of the duties to people whom you trusted who executed it well?

INTERVIEWEE: Yes.

INTERVIEWER: Please describe the type of support that you received from your top management. I think you did sort of touch on it earlier.

INTERVIEWEE: Yes. So, their support went up and down, I would say, with implementing of things initially, there was a lot of support because they were also thrown into this deep unknown and were also trying just to bounce off ideas and whoever of us created something, they would latch onto that and then with the help of everybody they would create guidelines. So in the beginning, it was quite good but then as it went along, it sort of faded a bit. There were stages, so top management, the people who did the protocoling and the guidelines, there was support from them. And then, top management, in the sense of the doctors, there was none. They were more scared than the staff, and I understand that it is unknown, but there were a lot of times where I felt that the radiologist had to be with my staff and not be the ones saying, "*No, no, you go do* it" and then just tell me about it. They'd be like "*Don't come in, don't touch me, don't touch my door*". There were one or two of the radiologists, who were troopers. They would go in with the staff, but the majority were the ones who would put a notice up on the door. So, most of the time, the support would be from your peers. And as I said, the top management that created the guidelines, my manager, would give us a lot of articles to read to try and help, together with us to just understand this better. And she would also bounce off ideas before implementing them, or if they did implement something, she would give us room to air our concerns and raise our voices. So, from her, we did receive a bit of support, but from the rest not so much.

INTERVIEWER: [redacted]

INTERVIEWEE: [redacted]

INTERVIEWER: [redacted]

INTERVIEWEE: [redacted]

INTERVIEWER: [redacted]

INTERVIEWEE: [redacted]

[redacted]

INTERVIEWER: Do you think that any new skills you acquired during the pandemic period that you can use as a middle manager, going forward? What would you say those are?

INTERVIEWEE: I would say that the routine of checking things and making sure that everything works definitely, like it was there before but now it's just a bit in depth, like, I'm so used to doing a walk through my departments every Monday and every Friday, to check that everything is working and to ask is everything still working? So that little tick box exercises it's now just something else, it's not luckily counting stock anymore, but yes, definitely that and then to just go with any scenario and situation, just to go like head-on, like face first, like just get in it because I used to within the Covid thing, I would just jump in and just show them, led by example, like this will be okay, we will be okay, let's just do it. So, a lot of times now in difficult situations or change, I will be like let's just go, let's just – we, someone has to do it and it's going to be me and so a lot less fearful for the unknown. I would say I'm not like a fearful person to change or anything like that where some people don't like change, but there is still that human aspect where you would think twice before going into something, so, still rationally going into something but, just facing it head on. And then I think the checking in with staff, making sure they're okay, more intact with their mental health, how they're feeling? That's definitely something, those, check-ins are very valuable, they feel that you care. They feel listened to and they feel that they're not alone in whatever they're going through, those are definitely things that I continued doing.

INTERVIEWER: [redacted]

[redacted]

INTERVIEWEE: [redacted]

INTERVIEWER: Anything that you can share with middle managers?

INTERVIEWEE: I don't know, there was a lot of things we did unnecessarily but also it was because of the unknown, so what I've realized in the stage of the unknown, we were so open to changes because we didn't know so we were willing to trial a lot of things to see if it works, where in a normal day to day, people are so set in their ways. So, I would say something that I've learnt from this is, try and think out of the box more in different situations. We don't have to wait for a pandemic to hit before thinking, how we can do things differently. And then also, to delegate your workload, I would say, involve your team; you are only as strong as the weakest link in your team. So to utilise your entire team, it can be small tasks, so that they also feel valued, and you can pull that through to your day-to-day things as well.

INTERVIEWER: Thank you very much for participating in this study, you've greatly helped me and this is highly appreciated and I thank you for your time and effort.

INTERVIEWEE: Thank you and you're welcome.

[end of transcription]