Title: Challenges in the capture and storage of digital information by rural clinics in Hammarsdale, KwaZulu-Natal Province

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Plagiarism declaration

I, Mbali Mchunu, declare that this dissertation is my work and has not been previously submitted, for the award of any degree, and all the sources that I have used, quoted, and cited have been indicated and acknowledged using complete references.

Signature: Signed by candidate

Date: 12/02/2024

Dedication

To my children Sibongakonke, Sinenhlanhla, and Smelokuhle, through it all, you have remained my greatest motivation and my greatest love.

To my mother, Advocate Clementine Zenzile Mchunu, thank you so much Nyandayemkhonto, I am forever grateful. This one is for you.

To my late grandfather, Mr. Caiphus Mchunu, my greatest CHEERLEADER! I know you are proud, you have always been proud of my every achievement. I did it!!!!!

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Abstract

The study examined the capture and storage of patient information by rural health care clinics in Hammarsdale in KwaZulu-Natal. The study was supported by the Digital Curation Centre Life Cycle model and the primary aim of the study was to identify the nature and scale of the challenges faced in the capture and storage of patient medical records. A mixed-method approach was adopted to the collection of data that was relevant to addressing the research objectives.

The study used convenience, self-selection, and expert sampling to select participants for the questionnaires and interviews. Interviews were carried out with selected staff in the records office at the clinics with a target sample of at least one staff in each clinic. Data collection methods included interviews and questionnaires. Triangulation was also adopted for cross-sectional analysis of the data collected. The study revealed that the rural clinics operated a duplicate system for the capture and storage of patient medical information.

Furthermore, the systems did not complement each other as both the paper and electronic records systems had their own weaknesses. However, the use of the paper records systems was predominant. The conclusion from the findings was that there was a need to institute policy measures to guide the capture and storage of patient medical records. The recommendations are that the DCC Life Cycle can be used as a guide in developing policies and guidelines on how both paper and electronic records can be captured and stored.

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CHC - Community Health Care
DCC - Digital Curation Centre
IRMT - International Records Management Trust
KZN - KwaZulu-Natal
PHC - Primary Health Care

CHAPTER 1: INTRODUCTION

1.1 Introduction

The study examined the capture and storage of patient information by rural health clinics in Hammarsdale in KwaZulu-Natal. Patient records are essential in enabling health care institutions to effectively deliver health care services to patients (Katurura & Cilliers, 2018). Poor management of patients' records can compromise the lives of patients which can cause health care institutions to be liable for negligence. Health care institutions are required by law through the National Health Act (2003) to create and maintain records of each patient (National Health Act, No. 61 of 2003). This can safeguard against unsafe or improper health care. The challenges faced in the capture and storage of patient records in the Mpumalanga Primary Health Care, Peaceville Primary Health Care, and Hlengisizwe Community Health Care.

1.2 Background to the Study

Records management is important in an organisation because records preserve the memory or history of the organisation. This also applies to the medical records of healthcare facilities. Healthcare facilities create and store records to support the efficient delivery of service. Nurses and doctors need to access a patient's medical records in a timely manner and this requires that records are captured accurately and stored in a manner that allows easy access. Failure to do this may put the lives of patients at stake as they may not be given accurate treatment. Marutha (2011) argues that the ineffective management of health records resulting from poor capture and storage may be dangerous and can make health facilities liable for legal action.

Patients' records are synonymously used with the term medical records (International Records Management Trust [IRMT], 1999). Luthuli and Kalusopa (2017: 2) describe the medical records as a written account of a patient's examination and treatment. Masuku and Ngulube

(2017) further define a patient's record as a record created by health care practitioners during consultation or examination of a patient. For this study, the term patient's record will be used interchangeably with medical records to mean the record of a patient's treatment that is created by doctors and nurses.

Clinics like other health facilities create records that are used for various reasons. These records are captured and stored so that they are available whenever they are required (Luthuli & Kalusopa, 2017). Marutha (2011) points out the uses of records in a health care facility as: providing a record of the business transactions of nurses and doctors, confirming the procedures followed when conducting a patient's treatment as well as investigating the cause of death. Marutha (2011) further stresses the need for sound record keeping as necessary in cases patients or citizens sue the health facility. Additionally, Luthuli and Kalusopa (2017) contribute that "at the core of the delivery of service is the need for effective records and information management delivery systems that provide reliable and authentic information so that patients are able to receive quality medical services".

The South African government under the guidance of the National Archives and Records Service of South Africa has developed legislation and guidelines for the management of patient records in Primary Health Care facilities, which were published in 2017. The content of the guideline is based on Section 13 of the National Archives and Records Service of South Africa Act, 1996 (Act 43 of 1996). The legislation provides the primary health care facilities' employees with guidelines for the proper procedures for filing, disposal, and storing patient records in a systematic and orderly manner for efficient retrieval. The National Health Act also requires health facilities to create a medical record that is maintained at that health establishment for each user of the health services (National Health Act, No. 61 of 2003). Furthermore, the National Health Act stipulates that health records should be made available when required to safeguard both users and health facilities against the dangerous possibility of receiving improper, shoddy, or delayed medical care.

The rural clinics in KwaZulu-Natal are also bound by legislation to create records of the patients who are treated in their facilities. The rural clinics that are the focus of this study are Mpumalanga Primary Health Care, Peaceville Primary Health Care, and Hlengisizwe Community Health Care. The clinics are located in Hammarsdale Kwazulu-Natal and they provide health care to the communities of Hammarsdale. The Peaceville and Mpumalanga

clinic offers basic essential health services while Hlengisizwe provides primary health care services 24 hours. The Peaceville clinic is regarded as level 1 as they offer basic services, meaning they do not have maternity wards and other facilities like dentists. Mpumalanga clinic is regarded as level 2 as they have maternity facilities and Hlengisizwe is the mini hospital as it provides more services and is open 24/7.

The clinics create both paper and electronic records. Paper records are created and then captured in electronic form. This creates duplication of effort as both paper records and electronic records are created simultaneously. The capture and storage of electronic digital records presents a challenge for rural clinics. Rural clinics face challenges in access to proper information and communication infrastructure yet they have to comply with national legislation in their capturing and storing of digital information. Poor connectivity and low bandwidth make the capture of records a problem and accessing the stored records in turn is difficult. This becomes a problem for the productivity of the administrative staff as they cannot access the system and they must use manual registration of patients.

Marutha and Ngoepe (2017) strongly argue for the need for proper management of medical records. This is possible if there are proper procedures for the capture and storage of the records in place. Marutha (2011) points out that "poor records keeping will lead to the failure of the health care system to deliver efficient services". There is limited research on the challenges that are being faced by Rural clinics in KZN and this study aims to fill the gap.

The capture and storage of electronic records present a challenge for rural clinics. Rural clinics face challenges in access to proper information and communication infrastructure yet they have to comply with national legislation in their capturing and storing of digital information (Masuku & Ngulube, 2017). The study by Masuku and Ngulube (2017) highlighted the inadequacy of medical records management due to the lack of a governing framework by the hospitals in the study. A framework that governs medical records is important so as to set standards for capturing and storing the records. Msiska, Kumitawa and Kumwendo (2017) in their study on the factors affecting the utilisation of medical records in Malawi hospitals revealed that poor connectivity and low bandwidth are obstacles to the effective capture of electronic records, and accessing the stored records, in turn, is difficult. In support of this, Katurura and Cilliers (2018) in a systematic review of publications done in sub-Saharan Africa revealed that power supply and connectivity affected the management of digital records. This

becomes a problem for the productivity of the administrative staff as they cannot access the system and they must register patients and maintain patient medical records manually. The implication was that digital records were created alongside paper records.

Marutha and Ngoepe (2017) strongly argue for the need for proper management of medical records. This is possible if there are proper procedures for the capture and storage of the records in place. Marutha (2011) points out that "poor records keeping will lead to the failure of the health care system to deliver efficient services". There is limited research on the challenges that are being faced by rural clinics in KZN in capturing and storing digital medical records. The study by Luthuli and Kalusopa (2017) on the management of medical records in South Africa highlights the challenges faced by large hospitals in managing medical records. A similar study by Masuku and Ngulube (2020) in Zimbabwean urban and rural hospitals highlighted that rural hospitals in particular lacked the adequacy to manage health records. The implication was poor management of digital medical records. The studies were focused on hospitals and revealed a gap in theory on the challenges faced by rural clinics, especially in KwaZulu-Natal areas. The challenges faced in the process can point to the areas that need to be addressed. This may be able to assist in coming up with strategies that lead to records being properly captured and stored to improve easy access to records, which would, in turn, improve health care provision in rural clinics. This, therefore, raises the question on what are the challenges faced by rural clinics in Hammarsdale KZN in the capture and storage of digital medical records.

1.3 Problem Statement

Records are important in health care facilities as they are used to confirm and trace the patient's background information (Marutha, 2011) or defend a complaint or case of clinical negligence. Without proper record-keeping practices which allow for the efficient capture and storage of records, it becomes difficult for health care providers in KZN to provide safe and competent health care (Luthuli & Kalusopa, 2017). This requires the existence of proper records management practices encompassing the proper capture and storage of records in digital form if records are to serve as evidence of medical practices. It was observed that the availability and accessibility of records have been a challenge for clinics in Hammarsdale.

Records were often missing or misplaced and this made it difficult to locate records when they were needed. This can cause rural clinics to fail to provide clinical services and can affect the treatment of patients. Hence, a need to investigate the challenges in capturing and storing digital records by primary health care clinics in Hammarsdale in KwaZulu-Natal.

1.4 Objectives of the Study

The primary purpose of the study is to identify the nature and scale of the challenges in the research sites. To achieve this the following objectives are stated:

i. To assess the challenges in the systems used for capturing and storing patient records in the rural clinics in Hammarsdale
ii. To identify the challenges in implementing policies and guidelines in the efficient capture of patient records
iii. To examine the suitability of the DCC lifecycle model for managing digital records in rural clinics in Hammarsdale.

1.4 Research Questions

i. Which systems are used in the capture and storage of digital patient records?
ii. What challenges are faced in the processes of capturing and storing digital patient records?
iii. Is there adequate infrastructure to facilitate the capture and storage of digital patient records?
iv. What government policies apply to the management of digital records in health care institutions?
v. Are there existing guidelines, policies and legislative frameworks governing digital patient records in the health care system?
vi. How can the DCC lifecycle framework provide strategies for the efficient capture and storage of digital patient records?

1.5 Significance of the Research

Patient records are important in health care institutions as they provide a history of the treatment of patients. It is important that the patient's records are properly captured and stored to ensure that they can be easily retrieved when the need arises. According to Marutha (2011) easy access to patient records is important so that they provide a reference for patient treatment. The study is important in identifying the challenges that are faced in capturing and storing digital patient records by clinics in rural areas. Understanding the challenges may influence the proper capture and storage of digital records. The study hopes to contribute to the Department of Health so that challenges facing rural health clinics in the capture and storage of records can be identified. Furthermore, the current study aims to bridge the gap in the literature as the challenges in the capture and storage of digital medical records in rural clinics have not been adequately addressed in the literature.

1.6 Scope of the Study

The study focuses on the clinic staff of Peaceville Primary Health Centre (PHC), Hlengisizwe Community Health Centre (CHC), and Mpumalanga Primary Health Centre (PHC), which are clinics under Mpumalanga Township, Hammarsdale (KZN). It evaluates the systems, policies, guidelines, and practices that are applicable to these clinics only.

1.7 Methodology

The study adopts a mixed-method approach to the collection of data that was relevant to addressing the research questions. The mixed methods are a pragmatic approach that combines the quantitative and qualitative research approaches in the sampling, collection, analysis and interpretation of the findings. According to Creswell and Plano Clark (2011), mixed methods can provide deeper insight into a research problem than using one of the individual approaches on its own. The research design used is the multiple case study design which allows the collection of data from more than one clinic in Hammarsdale. Yin (2014) suggests that

multiple-case studies can be more robust than single cases, as the evidence is drawn from a wider variety of sources. This study makes use of three rural clinics of Hammarsdale, namely, Hlengisizwe CHC, Mpumalanga PHC, and Peaceville PHC.

The population of the study is made up of nurses and records staff at Hlengisizwe CHC, Mpumalanga PHC, and Peaceville PHC. Sampling is used to select participants who take part in the study. The intention of sampling is to provide a reasonable idea of the data that would be contributed by the entire population, but with the researcher only having to interact with a representative group from the population (Li, Liping & Khan, 2018). This section of the population is used to provide a picture of what the whole population looks like. The study uses convenience sampling for the questionnaire component and a combination of expert sampling and self-selection sampling for the interviews to select participants for the study. In this study, convenience sampling is used to select nurses as the researcher considers them as the key informants who are knowledgeable about patient records. The study also identifies administrative staff as being suitable for this study. Expert sampling was used to choose the sample for the study by identifying participants with expertise in the field who will be able to contribute relevant data to the study in their respective clinics. A sample size of at least 50 participants was targeted in this study.

Data was collected using questionnaires, and interviews. Questionnaires were distributed to nurses in the clinics while interviews were conducted with administrative staff and with nurses who self-selected after completing the questionnaire. Yin (2014) points out that one of the advantages of a case study is that it allows the collection of data using multiple instruments. The data that was collected was analysed using quantitative methods of descriptive analysis and quantitative methods of thematic analysis. The DCC model was used as the framework for data analysis.

The validity and reliability of the research findings were established through the appropriate design of the research instruments and pilot testing. Babbie (2014) suggests that "reliability is a matter of whether repeated application of a particular technique on the same subject produces the same results each time, whereas validity is concerned with the level to which an empirical measure adequately reflects the real meaning of the concept under consideration."

1.8 Conceptual Framework

The study was informed by the Digital Curation Centre Life Cycle Model (Constantopoulos et al., 2008) (Figure 1.1) which provides a conceptual framework. The DCC model is appropriate for this study as it can provide substantial detail of digital records capture and storage and the policies and guidelines that are involved, while still providing the broader context for the digital curation process, and providing points of contact to other processes that may be affected. The DCC Lifecycle Model places emphasis on standards and policies in managing digital records (Chikomba, Rodrigues & Ngoepe, 2021). This can show the standards that are being followed in the capture and storage of digital information by clinics in the research scope. The model can be used for the planning and organisation of digital records management in clinics. It can pinpoint the important activities that help in the capture and storage of digital records. The challenges that are being experienced in the process of capturing and storage of digital records can become evident, as can their implications for associated processes in the lifecycle.

According to Shibambu (2019), "the model allows the discussion of each construct independently in order to add improvement in line with the situation it is needed for." Therefore, the study requires the selection of constructs that deal with creation and storage as well as the policies and standards that need to be applied. The sequential actions of the create and receive, ingest, and storage are selected in this study to examine the challenges in the capture and storage of patient records. The creation and receiving mirror the capture of patients' records. This is done through the use of various systems and the current study sought to identify the systems used in the capture of records and the challenges faced by these systems.

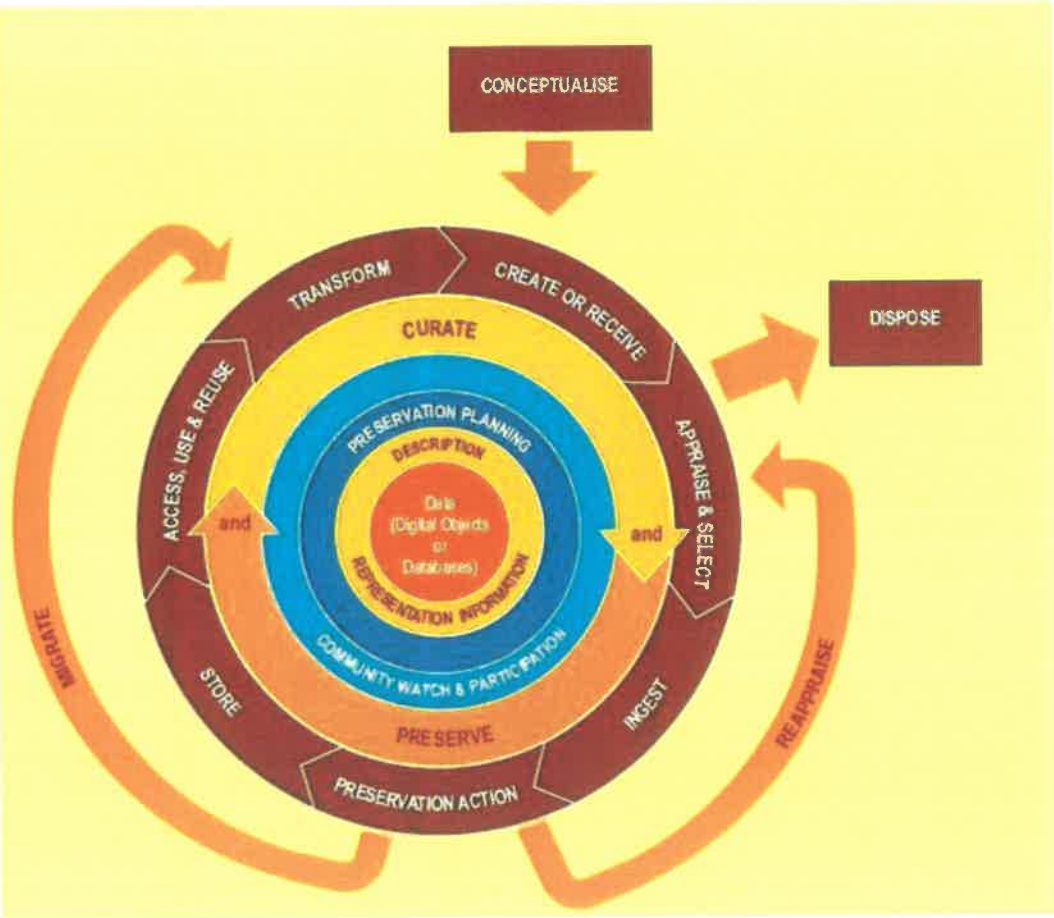

Figure 1.1 Digital Curation Centre Lifecycle Model (Adopted from Constantopoulos et al, 2008)

The ingest process involves the transferring of data to repositories while adhering to a set of standards. These standards are important in ensuring that the capture of records is done properly before they are moved to storage. It is important to understand the storage of records and the standards used so as to understand the challenges faced.

The model was applied along with the researcher's underlying assumptions, plans, and practices and implementation of the entire research project; the research objectives as it were. Table 1.1 shows the selected DCC life cycle stages and the activities expected at each level, the researcher then generated the research objectives from these.

Table 1.1 Conceptualising the DCC Lifecycle Stages

DCC Life Cycle Stages	Activities	Objective
Create and receive	Data Capturing	Inquiry of the system in place and the challenges faced.
Ingest	The use of standards and policies	Inquiry on the policies and standards used and the challenges of implementing them
Store	Storage policies and archiving of data	Inquiry on the systems in place and the challenges faced in storing data.
(Consolidated)	(Consolidated)	Inquiry on the suitability of the DCC as a framework for the storage of records

1.9 Delimitation and Limitations of the Study

The study was restricted to the investigation of challenges faced by rural clinics in the capture and storage of digital patient records. The study makes use of the clinic staff of Peaceville Primary Health Centre (PHC), Hlengisizwe Community Health Centre (CHC), and Mpumalanga Primary Health Centre (PHC), which are clinics under Mpumalanga Township, Hammarsdale (KZN). This study sought input and made use of the healthcare professionals (nurses) and administrative staff of Peaceville, Hlengisizwe, and Mpumalanga clinics. Time and financial constraints did not impact the study and the researcher allocated enough time for the study as well as the resources needed.

1.10 Ethical Considerations

"Ethics in the research process means to conduct or an expected social norm of behaviour while conducting research" (Li, Liping & Khan, 2018: 36). Kumar (2019) considers "ethics as the moral values of professional conduct that are considered desirable." Informed consent,

participant confidentiality, and obtaining approval through ethical clearance with the institution and the Department of Health in KwaZulu-Natal were among the ethical problems that were prioritized in this study.

1.11 Definition of Key Concepts

The meaning of the main terms in this study will be explained. The meanings will be expressed according to how the researcher uses them in the study.

1.11.1 Digital Records

These are records that are captured using information and communication technologies. They are electronic records and they refer to information that is captured electronically and stored using computer technologies (National Archives and Records Service of South Africa, 2006).

1.11.2 Primary Health Care or PHC

Refers to essential health care that is based on logically sound and socially acceptable procedures.

1.11.3 Patient Record

The patient record refers to any relevant medical record made by a healthcare professional at the time of/or after consultation and/or examination or the application of health management. A health record contains the information about the health of an identifiable individual recorded by a healthcare professional, either personally or at his/or her direction (Department of Health, 2017).

1.11.4 Record

A record is defined as "information created, received, and maintained as evidence by an organisation or person, in pursuance of legal obligations or in the transaction of business" (ISO 15489.1 2002). "It is information registered in any form produced, obtained, and preserved by an entity as proof of its daily transactions" (Marutha 2016).

1.11.5 Records Capture

This involves the generation of records by recording, documenting, and having an audit trail of activities within an organisation. The International Records Management Trust (2008) argues that "a records management system can generate or capture the contents, context, and structure within the business that produces them. This is equally important when capturing electronic records as all the metadata should be captured."

1.11.6 Records Management

Records management "is the process of managing records or documented information throughout its life cycle, from production to disposal" (National Archives and Records Service of South Africa 2007).

1.11.7 Records Storage

According to Alegbeleye and Chilaka (2019) "the records that are created in an organisation must be stored so as to facilitate access and to ensure that they are protected from unauthorized access, use, disclosure, removal, deterioration, loss, or destruction."

1.12 Outline of the Study

The study is made up of five connected chapters.

The first chapter introduces and provides the background to the research problem as well as outlines the research problem. This helps in explaining the motivation for carrying out the study

and placing the study in context. The research objectives and questions, and the significance of the study are discussed.

This is followed by Chapter 2 which focuses on the review of related literature. The review will identify the conceptual framework and discuss the key themes of the study.
Chapter 3 discusses the methodological issues pertaining to the study and this is followed by a presentation and discussion of findings from the data collected in Chapter 4.

Chapter 5 concludes the study by outlining the conclusions made by the researcher and recommendations to the key stakeholders.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter discusses the literature on the subject of the capturing and storing of digital information by rural clinics in KwaZulu-Natal (KZN). "A literature review involves incorporating theory into the research design so as to embed it into a wider literature which helps to refine your research questions" (Hennik, Hutter & Bailey, 2015). The literature review, according to Creswell (2014), "is the application of theory to provide insights on methods the researcher might narrow the scope to a needed field of investigation. The literature review provides a conceptual understanding of the research problem for this study, hence supporting the research's importance."

For this study, books, journals, theses, dissertations, and Internet sources were used to collect information about the research problem. The literature review is effective in getting an insight into what other scholars have said about the challenges faced by clinics in the capture and storage of digital information. The literature review further allows a researcher to see how similar problems have been dealt with by other researchers and reveal previously unknown sources, while simultaneously providing a historical and comparative perspective against which to measure the current study (Leedy, 2015). The literature review was guided by the objectives of the study.

2.2 Nature of Health Records

Health records are the foundation of healthcare facilities and are sometimes referred to as medical or patient records. A medical or health record, according to Garba and Harande (2018), is a document that contains information about the who, what, why, where, when, and how of patient care while they are in a hospital. "A health record is any relevant record made by a health practitioner at the time of or subsequent to a consultation and/or examination or the application of health management," according to Masuku and Ngulube (2020). These serve as

a documented record of a patient's assessment and care (Luthuli & Kalusopa, 2017). It serves as a resource for a variety of medical-related information needs. A comprehensive medical file will include the patient's personal information, an overview of the health history of the patient, together with the details of every occurrence of symptoms, diagnosis, course of therapy, and results should be documented (Garba & Harande, 2018; Luthuli & Kalusopa, 2017, Marutha, 2011).

The medical record serves as a gauge of the amount of work performed by the nursing and medical staff, a record of the patient's progress, and a source of information for numerous other uses (Garba & Harande, 2018). Patients' lives are at risk and they can receive the incorrect care if appropriate health records are not readily available. Thus, the medical records serve as a vital support system in these hospitals. "A patient record serves as a communication instrument in healthcare facilities," according to Ngidi (2015). This is so that a wide range of patient information, such as the patient's medical history and current therapy, can be shared amongst clinicians thanks to the patient's record (Masuku & Ngulube, 2020).

2.2.1 Digital Health Records

Traditionally, health records were created in paper format but due to the technological revolution medical facilities have embraced the use of ICTs to record patient information and other administrative businesses. This has led to the emergence of digital health records or electronic health records which are an alternative to paper-based patient records. Ariffin et al. (2018) consider electronic medical records as "computerized medical records that can be accessed from various integrated systems at any point of care within the health care enterprise with concerns of patient privacy, confidentiality, and security". An Electronic Medical Record is a "digital record of all information related to the patient such as patient orders, drug records, diagnosis, lab results all consolidated into one record to be viewed by authorized personnel" (Yakubu, 2013).

The digitisation of records facilitates a centralised patient information repository (Garba & Harande, 2018). There is simultaneous access to the patient's record and health care organisations have the opportunity to improve the quality of patient care and safety (Akanbi, 2011). This can reduce the cost of records storage and improve efficiency in record keeping.

Implementing electronic health records can enable patient registration as well as tracking of patients which improves continuing care. Katurura and Cilliers (2018) note that "electronic health records enable sharing of patient data between points of care with the added advantage that current information is available to make decisions about health outcomes for health care providers".

2.3 Digital Health Records Management

The International Records Management Trust (IRMT) (2009) considers the concept of records management as an overarching term to describe "the task of ensuring that all recorded information, regardless of form and medium, is managed in an economical and efficient manner." Yaya et al. (2015) consider records management to be "the systematic and consistent control of all records in which they are held throughout their lifecycle." This implies the planned and methodological management of records employing a consistent approach whether they are paper or electronic records. Luthuli and Kalusopa (2017) assert that "at the core of the delivery of service in health facilities has been the need for effective records and information management delivery systems of reliable and authentic information so that patients are able to receive quality medical services". This gives emphasis to the need to manage records in health care facilities.

"Electronic (digital) records management involves the management of electronic records through capturing and managing records in different formats throughout their life span" (Marutha, 2011: 15). They are computer-based systems for storing, organizing, and retrieving information about patients and hold tremendous expectations for improving the quality and safety of healthcare (Ariffin, 2018). Patients' personal and medical information can be collected, stored, and shared with others through the use of electronic records management systems (Katurura & Cilliers, 2018).

Digital or electronic records are not easy to handle, requiring special care and expertise. Ngulube and Tafor (2006) consider them to be sensitive and if they are not managed properly they will easily disappear. This means that companies must come up with plans to ensure that they set a solid foundation before embracing new technologies and putting electronic records

into place (Marutha, 2011). There is a need for proper planning employing policies and guidelines to ensure that the digital records in health care institutions are managed properly throughout their life cycle. Ngulube and Tafor (2006) suggest collaboration between records management professionals, and ICT professionals, to enable proper planning. This will lead to the successful implementation of electronic records management in health care institutions.

2.4 Conceptual Framework

The Digital Curation Centre Lifecycle Model was developed by Higgins (2008) to provide a model for the lifecycle phases of digital information. The model is presented in Figure 1.1. The main ideas and tenets of the model offer a visual summary of the steps required for the effective administration of digital records starting at the point of creation (Odhiambo, 2018). It illustrates the steps necessary for the effective curation and preservation of digital content from the point of conception (Constantopoulos et al., 2008). The DCC model's principles can be used to plan the capture and storage of digital records by health care facilities so as to ensure their sustainability. The application of the DCC can be used to ensure that all the stages involved in the capture and storage are carried out. Chikomba, Rodrigues and Ngoepe (2021) note that the DCC supports the use of policies and guidelines as the key components of records management programmes. This will ensure that the people are guided when capturing and storing digital records and can also ensure that they preserve the data's authenticity, reliability, and usability. Marutha (2011) quoted Decman and Vintor (2013) who also argue that pertinent policies should also be formulated to give guidance on the system procedures.

2.4.1 DCC Life Cycle Processes

The DCC life cycle processes are presented in three categories, namely, the full life cycle actions, the sequential actions, and occasional actions. These actions were designed to allow for the organisation and planning of curation and preservation activities. These are discussed below.

i. Full Life Cycle Actions

These are at the core of the model and they represent the activities that should be done throughout the life cycle of digital records. The lifecycle processes are explained below according to Constantopoulos et al (2008).

- **Description and representation information**

This has to do with the administrative, technical, structural, descriptive, and preservation information that is necessary to provide a long-term accurate description of a digital asset. This is carried out using crucial data that is required for the comprehension and display of the item and its metadata.

- **Preservation Planning**

This is made up of the necessary administrative and management plans for the preservation actions of the lifecycle model.

- **Community Watch and Participation**

This encompass the analysis of appropriate standards and tools as well as assisting in their development and evolution.

- **Curate and Preserve**

Throughout the curation lifespan, this activity promotes carrying out all management and administrative tasks that are scheduled to support curation and record preservation.

ii. Sequential Actions

According to Constantopoulos et al. (2008), by outlining a series of tasks that must be completed, the sequential lifecycle actions help with the curation and preservation process. There is an order in which these steps must be completed. Below is a summary of these.

- **Conceptualisation**– the planning of the creation of data and as well as its storage.
- **Create and receive**- this is the creation and reception of data which includes the administration, descriptive, structural, and metadata.
- **Appraise and select**- this action involves the appraisal of data to ensure its long-term preservation. This is done within a well-established regulatory framework.

- **Ingest**- this is the ingestion of data through transferring the data to repositories while adhering to set standards.
- **Preservation**- preservation actions such as cleaning and the validation of data, and maintaining appropriate data structures, and file formats. It seeks to preserve the authenticity and reliability of the data
- **Store**- secure storage of the data according to set standards
- **Access and use**- making the data easily accessible so that it can be used and reused.
- **Transform**- the transformation of data either migrating it into new formats or creation of new data.

iii. Occasional Actions

The DCC's occasional lifecycle actions are defined by Constantopoulos et al. (2008) as those that are carried out less frequently but are necessary to guarantee that the right action has been performed. These three actions are migration, reappraisal, and disposal.

- **Discard**- the act of getting rid of data that hasn't been chosen or vetted for preservation. The process of disposing of data is moving it to an archive or repository or destroying it.
- **Re-appraise**- this is the reappraisal of data that may not have met validation standards.
- **Migrate**- this is migrating the data to a different format in case the current format does not conform to new storage requirements.

The DCC model provides an overview of the various processes that a digital record goes through from its creation to disposal. The current study is concerned with the capture and storage of digital information in rural clinics. The model provides a framework for this study as it provides flexibility in the selection of constructs. Shibambu (2019) claims that the model enables the discussion of each construct separately in order to add improvement in accordance with the necessary circumstances. Therefore, the study requires the selection of constructs that deal with creation and storage as well as the policies and standards that need to be applied.

2.5 Legislation Underpinning Health Records Management in South Africa

According to Shibambu (2019) legislation impacts how records are created and stored in networked environments as well as paper records in any country. Luthuli and Kalusopa (2017)

concur that "a legal and regulatory framework is critical to records management governance". In South Africa, a legal framework governs the management of records in both public and private sectors. This legislation applies to the management of both paper-based and electronic records. The legislation aims to ensure that people comply with procedures and standards requirements. Accountability of administrative actions in the business or services is essential (Marutha, 2011). The National Archives of South Africa Records Service Act (1996) and National Health Act (2003) provide the legislation that is applicable to health records.

2.5.1 National Archives of South Africa Records Service Act 43 of 1996

The Act was promulgated in 1996 to provide a legislative framework regulating records management functions for governmental departments at the national level of government South African Local Government Association, 2020). The National Archivist is tasked by the Act with making sure priceless public and private records are properly preserved so that the public and the government can continue to use them (Marutha, 2011). Under Section 13(1) of the Act, the National Archivist has the responsibility to ensure the "proper management and care of records in the custody of governmental bodies,". Along with establishing rules and regulations for the maintenance of records and archives, the archivist is also required to maintain an automated national system for retrieving archival material. The National Archives can provide help and guidelines in terms of standards and guidelines to the public health sector (National Archives and Records Service of South Africa Act. No. 43 of 1996 as amended; Marutha, 2011; Shibambu, 2019).

2.5.2 National Health Act (2003)

The National Health Act (NHA) of South Africa (2003) was established to bring uniformity to health services in the country as set out by the Constitution (Luthuli & Kalusopa, 2017). The Act also provides guidelines for health records creation and storage. According to the Act, health facilities must ensure the creation and maintenance of records. at that health institution for service delivery, as stipulated by the National Archives and Records Service of South Africa Act (Act No. 43 of 1996). Furthermore, the act stipulates that a health record should be "created and maintained at that health establishment for every user of health service" and protected ((National Health Act, 2003). The NHA provides guidance to institutions on how health

departments should be governed in both public and private hospitals (Luthuli, 2017). The act can guide the creation and storage of digital health information in clinics by setting out how records are created and how they should be stored.

2.6 Challenges Faced in Managing Digital Health Records

According to Marutha (2011), managing and preserving digital archives over the long term is a daunting task for archivists and records managers in Africa. Digital records are frequently captured electronically or converted from paper to electronic form using scanning and other ICT tools. Poor and inadequate infrastructure, limited funding, lack of expertise, bad connectivity, and technical obsolescence are just a few of the difficulties encountered.

2.6.1 Poor Connectivity

Poor and unreliable connectivity is a major challenge for health facilities that make use of digital records. Yaya et al (2015) point out that the majority of countries in sub-Saharan Africa lack the necessary telecommunication facilities needed for faster transmission. This leads to low bandwidth which causes connectivity challenges for remote areas like rural areas. Akanbi (2011) observed that although many countries in Africa have internet connectivity, access is often concentrated in developed urban areas while rural areas have poor or no connectivity. This means that rural clinics can enjoy the full benefits of electronic records management.

2.6.2 Poor Infrastructure

The technological infrastructure that is needed for the smooth running of electronic business processes is often not available in remote areas. Akanbi (2015) notes that in Africa, power outages and network breakdowns are common occurrences due to lack of funds to set up and maintain the systems. This is supported by Yaya et al. (2011) who say that "frequent power outages constitute a bottleneck to digitization in Africa". This makes it difficult to maintain a conducive and sustainable technological infrastructure necessary for digitization. The electronic records have to be supported by parallel data entry in paper formats which results in duplication of effort and overload of work.

2.6.3 Inadequate Funding

Yakubu (2013) noted that the set-up of electronic records management systems is capital-intensive which is beyond the reach of most health providers in Sub-Saharan Africa. The systems also require frequent upgrades due to continuous changes in hardware and software. Yakubu (2013) observed that the high cost against a background of inadequate funding is a problem identified in most literature. Most electronic health systems are set up using funds from external donors which raises questions about their sustainability over time. Luthuli and Kalusopa (2017) in their study mention the lack of sufficient financial reserves as the main constraint that the Department of Health often encounters in its interventions to transform public service delivery.

2.6.4 Lack of Skills

Yakubu (2013) observed that few countries in Africa have the manpower and skills to develop and use the required infrastructure. Yaya et al (2015) also noted that one of the challenges in managing hospital records in developing countries is educating record keepers in hospitals on the best ways to handle hospital records. The lack of computer skills limits the extent to which health facilities are able to manage records efficiently as they face challenges with entering data into the systems in real-time (Msiska, Kumitawa & Kumwendo, 2017). These challenges can impact record-keeping systems in cases where there is a breakdown and disruption of services.

2.6.5 Technological Obsolescence

Msiska, Kumitawa and Kumwendo (2017) argue that the technology aspect has the challenge of integration/interoperability of medical devices and different legacy health information systems. This is coupled with the hardware and software that are constantly changing, making integration a difficult task. Marutha (2011) also alludes to the challenges of obsolete technological capacity. and further adds that if staff are not proactive about e-records, the changing technology and fragile media result in records being missing or lost.

2.7 Empirical Studies on Digital Health Records Management

Various studies have been conducted on health records management and the challenges thereof. Marutha (2011) conducted a study on the public health sector records management in Limpopo, South Africa. The objectives of the study were to find out if record systems support or undermine service delivery and e-health readiness. The study's findings pinpointed the fact that records management negatively affected timely and effective health care services.

Luthuli (2017) carried out a study on the records management practices in both private and public hospitals in Mhlathuze in KwaZulu-Natal. The study sought to establish through comparative analysis whether records management practices support service delivery in the context of Batho Pele principles. It also assessed ICT use in medical records management. The study found that records management practices were not well developed which undermined service delivery. The use of paper records was found to be dominant in public hospitals with electronic records being largely practiced in private hospitals. The study also established the challenges faced which were poor connectivity due to low bandwidth, lack of staff skills and training, and inadequate infrastructure.

These studies employed the records management life cycle model as the theoretical framework for the study. The studies also focused on the broad concept of records management. The current study departs from this approach and focuses on selected processes of records management and their challenges. The study focuses on the challenges faced in the capture and storage of digital patient records by clinics in Hammarsdale in rural KwaZulu-Natal. The study further employed the DCC life cycle model which has not been widely applied in the field of health records. The study will therefore demonstrate the suitability of the model in digital health records management.

2.8 Chapter Summary

The chapter reviewed literature on the capture and storage of digital records in health facilities. The chapter provided an explanation of the concepts of records and digital records. An overview of digital health records and the guiding theoretical framework was given. It was established that the National Archives and Records Service South Africa Act and the National Health Act were the key legislation that can guide records management of digital patient

records in health facilities. The challenges that are faced in the management of digital records are given. The conclusion drawn from the literature review is that there is limited literature that deals specifically with the challenges in the capture and storage of digital patient records.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The focus of this chapter is the research methodology that the researcher utilised in collecting the data for the study. The methodological considerations in research imply the steps taken by the researcher in examining his research problem, as well as the logic behind them (Kothari, 2004:8). The research methodology explains the research approach that guides the study and the research design. The chapter further discusses the population, sample size, and sampling procedures. The data collection procedures and the research instruments, such as the questionnaire, interviews, data presentation, and analysis, as well as the ethical considerations, are discussed in the study.

3.2 Research Approach

The study adopted a mixed-method approach to the collection of data that is relevant to addressing the research questions. Mixed-method is a pragmatic approach that combines quantitative and qualitative research approaches in the sampling, collection, and analysis of data. The intention is to give a greater understanding of the topic or problem in question than either a quantitative or qualitative approach on its own would provide (Creswell & Plano Clark, 2011). It makes the best use of the advantages of both qualitative and quantitative data. Quantitative data was collected primarily from questionnaires, while interviews were supplied mainly with qualitative data.

The mixed method is ideal in that the aims of the study can only be achieved through collecting the divergent views and insights of nurses and records staff. The mixed-method research approach examines a phenomenon by bringing together the qualitative and quantitative approaches to research. Kumar (2019) believes that mixed methods represent an alternative to the qualitative and quantitative methods by advocating for the use of methods that are best in answering the research questions. This allows the research to show contrasting and

complementary perspectives. Creswell and Plano Clark (2011) proffer that mixed methods relate to research wherein the researcher makes use of various elements of both the quantitative and quantitative approaches in terms of the research perspectives, data collection, and analyses. This is done to get a more reliable understanding of the research problem far more than the use of a single approach would.

Through the use of the mixed method, research problems are viewed from a variety of perspectives. The mixed approach regards the use of multiple sources as being beneficial in terms of quality and the fullness of data it produces (Denscombe, 2017). Creswell and Plano Clarke (2011) view the mixed method as a better option in that, it provides strengths that offset the weakness of both the quantitative and qualitative research. Cohen, Manion, and Morrison (2018) posit that the stronger the mix the stronger the authenticity of the findings. The potential and likelihood of unanticipated outcomes is increased, and this can lead to a better understanding of research problems than either approach alone (Creswell & Garrett, 2008).

Although mixed techniques are effective, they have certain drawbacks, such as the requirement for substantial data collecting, which may result in an extension of the research design's total duration (Creswell, 2014). According to Denscombe (2017), a researcher must practice and hone his abilities in both qualitative and quantitative methods. Combining the benefits of both qualitative and quantitative research methods might help address the research topic while mitigating their respective flaws. Both qualitative and quantitative methodologies provide a biased view of society which requires that the researcher use both approaches (Ngulube, 2013).

The concurrent or convergent mixed method was adopted as it enables the researcher to mix the research approaches simultaneously for the whole process of the research. According to Creswell and Plano Clark (2018) the motivation of the convergent design is the need to bring together results from both quantitative and qualitative for the purpose of comparing the findings. These comparisons provided the researcher with an understanding of the research as one approach validated the findings of the other. The researcher was able to see the results from the quantitative findings diverge from the qualitative findings. This was the main rationale underpinning the choice of method.

3.3 Research Design

The research design that was used is the multiple case study design which allowed the collection of data from more than one clinic in Hammarsdale. Yin (2014) provides that the evidence from a multiple-case study is considered more compelling, and the overall study is therefore regarded as being more robust. This study makes use of three rural clinics of Hammarsdale, namely, Hlengisizwe CHC, Mpumalanga PHC, and Peaceville PHC. The strength of the multiple case study is that it allowed the comparisons of findings between the clinics. The use of multiple case studies was further motivated by the fact that they have the ability to explore, explain, and describe the challenges that are faced by nurses and records staff in rural clinics in Hammarsdale in KwaZulu-Natal. They enabled the researcher to get unique descriptions of the challenges within the natural setting of the participants.

The case study was also chosen due to its ability to allow the collection of data from multiple information sources. This allows triangulation, which is the use of multiple data collection methods, sources, or observers (Stake, 2000 in Houser, 2015). Ritchie and Lewis (2013) point out that the case study is defined by its multiplicity of perspectives that are rooted in the context or several contexts that come from multiple data collection methods and multiple accounts.

3.4 Population

The population of the study was made up of nurses and records staff at Hlengisizwe CHC, Mpumalanga PHC, and Peaceville PHC between 10 July 2023 and 10 August 2023. The population figures were obtained from the annual report provided by the Human Resources Manager (HR) of Hlengisizwe Community Health Clinic and it included the number of all the nurses in the district, the Manager had to give the exact number of nurses per research site. The total population is presented below.

Table 3.1 Population of the Study

Name of Clinic	Number of nurses	Number of records Staff
Hlengisizwe	130	9
Mpumalanga	27	8
Peaceville	22	4
Total	**179**	**21**

3.5 Sampling

Sampling was used to select participants who took part in the study. Li, Liping and Khan (2018) view sampling as a technique used by researchers to gain access to a section of the population. This section of the population is used to provide a picture of what the whole population looks like. Administration of the questionnaire instrument used convenience sampling, and a combination of expert sampling and self-selection sampling was applied for the interviews.

3.5.1 Convenience Sampling

The study used convenience sampling to select participants for the questionnaires. Kumar (2019) argues that convenience sampling is guided by the convenience of the researcher in terms of easy accessibility, proximity, and easy approval for undertaking the study. He further argues that convenience sampling is commonly used in qualitative research but can be borrowed to meet the requirement of randomised samples (Kumar, 2019). In support of the use of convenience sampling Kriska, Sass and Fulcomer (2013) state that most sampling plans capitalise on convenience sampling, and simple random sampling is actually based on convenience and focuses on participants who are available at that time and who are picked randomly. This has the advantage of removing potential biases and allows the selection of a sample that enables the researcher to make inferences. The collection of quantitative data is meant to complement the qualitative and this motivates the use of convenience sampling for this study.

In this study convenience sampling was used to select nurses who are conveniently available at the time the researcher visits the clinics. The questionnaires were distributed to those nurses

who were accessible at that time. There is a total of 179 nurses in all of the clinics combined and they were all the target of the study. The researcher targeted a sample size of at least 20% of the nurses which is 36 nurses, with an average of 12 nurses per clinic. The 20% gives a margin of error of minus 15% at a confidence level of 95% and a 50 % response rate. Conroy (nd) argues that it is not always necessary to have a small margin of error. In support of this Anderson and Vingrys (2001) assert that small samples in large populations are acceptable as the intention is not to quantify but to show the extent to which the participants demonstrate the effects being investigated. Hence the current study focused on a small sample with the intention to document the existence of the challenges faced in the capture and storage of digital records. In this regard, a large sample is not important as the study does not intend to generalise the results.

3.5.2 Expert Sampling

Expert sampling was used to select the sample of participants to be part of the interviews. Expert sampling is sampling where the researcher selects participants who possess particular expertise and whose knowledge can provide answers to the research questions. It is also known as judgement sampling and the researcher will use their judgement on the participants who can best provide information for the study (Kumar, 2019). The researcher used their expert knowledge of the population to choose a representative sample (Battaglia, 2011). The focus was on the individuals who have the expertise and hence the knowledge that allows the researcher to explore the depth of the research problem. The participants' expertise in records creation and record keeping provided the basis for the identification of the participants for the interviews. In this regard, the researcher targeted records staff to take part in the interviews as key informants in the study. The researcher targeted at least one records staff member from each clinic to ensure representativeness. The target population for the interview was 5 across all the clinics. The researcher personally sought the records staff across the clinics and interviews were conducted with those who were conveniently accessible at the time the researcher visits the clinics.

3.5.3 Self-Selection Sampling

Self-selection sampling involves the participants choosing whether to be part of the study or not. They will deliberately make themselves part of the sample as this makes this type of sampling be described as volunteer sampling. Sharma (2017) argues that this type of sampling has participants willing to take part in the study and they will be committed to providing in-depth responses. This can enhance the validity of the findings. In this regard the researcher also conducted interviews with a sample of nurses, using the same interview instrument used for the records staff interviews. Their participation was solicited through the questionnaire, in which they were asked if they wished to take part in an interview. The study targeted at least one nurse from each clinic to ensure the representativeness of the study.

Table 3.2 Summary of Population and Target Sample Size

Name of Clinic	**Number of nurses**	**Number of records Staff**	**Questionnaire Sample Size**	**Interview Sample Size for records Staff**	**Interview Sample Size for Nurses**
Hlengisizwe	130	9	12	3	3
Mpumalanga	27	8	12	1	1
Peaceville	22	4	12	1	1
Total	**179**	**21**	**36**	**5**	**5**

3.6 Data Collection Methods

Data was collected using questionnaires and interviews. Questionnaires were distributed to nurses in the clinics while interviews were conducted with purposively selected records staff and with nurses who were interested in contributing to an in-depth understanding of the research questions. Yin (2014) points out that one of the advantages of a case study is that it allows the collection of data using multiple instruments.

3.6.1 Questionnaire Instrument

The questionnaire was considered for this study due to its merits. Kumar (2014) points out that questionnaires tend to encourage frank and well-thought-out answers as respondents answer in their own time. This is due to its anonymity and the absence of bias of the researcher. It becomes effective in measuring perceptions. The questionnaires are also cost-effective and can make use of large samples. This leads to the results being dependable. However, the questionnaires were prone to a low response rate. The researcher made a follow-up on the questionnaire and a large sample was used to ensure that the researcher got an appropriate response rate.

The questionnaire (Appendix G) has been designed in line with the research questions which are in turn aligned with the structures of the DCC Digital Curation Centre Lifecycle Model. A review of relevant literature and the challenges typically encountered in the managing of records also contributed to the questionnaire design. The questionnaires were distributed physically by the researcher. Physical copies of the questionnaire were left in the nurses' station and a notice informing the nurses about the questionnaire was pinned on the nurses' notice board. The notice is attached in Appendix E. The researcher first requested permission to place the invitation on the staff notice board to make the nurses aware of the questionnaires (the permission is attached in Appendix D). The notice explained where the completed questionnaire should be placed which is in the box in the nurses' staff room. Envelopes were placed near the box with the instruction that the completed questionnaire should be placed inside an envelope to preserve the privacy of the participants.

3.6.2 Interview Instrument

The semi-structured interview was used and it involved the creation of an interview guide to guide the researcher in interviewing. The interviews were conducted with selected staff in the records office at the clinics with a target sample of at least one staff in each clinic and a total target sample of five staff members. The nurses in the clinics were also asked if they were interested in participating in the interviews and the researcher targeted five nurses for interviews. Semi-structured interviews are a method that allows the researcher to ask further questions if necessary to get an in-depth understanding. Cohen, Manion and Morrison (2018)

consider interviews as the interchange of views between people, which results in knowledge production. The purpose of interviews was to find out about things that cannot be seen or heard such as the reasoning behind actions and feelings (Denscombe, 2017). This permitted one to get detailed data on the views and experience of records staff in capturing and storing patient records. To understand the challenges faced by staff, detailed insights are required and this made it an instrument of choice in this study.

The interviews were meant to provide complementary data to the data collected from the questionnaire and are derived from the research questions which are aligned with the DCC life cycle model. Interviews were carried out after setting up appointments with the staff members in the records office as well as nurses. The interview guide is attached as Appendix C which includes the Consent Form and Interview Schedule. Interviews were recorded by the researcher with the participants' permission for later transcription and analysis. Some participants were not comfortable with being recorded hence they consented to written interviews.

Semi-structured interviews have the advantage that the questions can be prepared beforehand and this allows the researcher to be ready for the interview. It made the researcher confident in carrying out the research and this can motivate the people being interviewed. The drawbacks are that the interview can be time-consuming and to counter this, the researcher set up an interview appointment with the records staff and nurses who were interested so that they both set up a time for the interviews.

3.7 Data Analysis Process

The data that was collected was analysed using quantitative methods of descriptive analysis using the SPSS software and qualitative methods of thematic analysis. Descriptive statistics involves reducing the data into tables, bar graphs, and charts so as to provide a numerical description. Qualitative data involves the search for themes. The qualitative data was first transcribed and coded, it was then analysed according to the themes that emerged.

The findings from the qualitative and quantitative data were analysed and interpreted simultaneously. This means that the qualitative data was combined so as to complement the

quantitative findings. The DCC model was used as the framework for data analysis, using the detailed procedural elements of the model as a checklist for the themes and details that emerge from the data.

3.8 Validity and Reliability

The validity and reliability of the quantitative research findings were established through the appropriate design of the research instruments and pilot testing. Babbie (2014) suggests that reliability is a matter of whether repeated application of a particular technique on the same subject produces the same results each time, whereas validity is concerned with the level to which an empirical measure adequately reflects the real meaning of the concept under consideration. Since the study also utilised qualitative data, the study sought to measure the trustworthiness of the study as reliability cannot be adequately established in case study research. The study ensured the trustworthiness of the data collected through accurate and deep descriptions of the findings. Pretesting the research instruments ensured that the instruments were consistent. The pretesting was done with the nurses who were not part of the study. The questionnaire was properly worded so as to remove ambiguity. Validity was ensured by the inclusion of both open-ended and closed questions that are linked to the research questions and objectives. They matched the variables under investigation in the study, which improved the reliability and validity of the study's conclusions. The combination of quantitative data with qualitative data gives an indication of trustworthiness, where responses to questions relating to similar topics can be compared between the two datasets during analysis.

3.9 Ethical Considerations

Ethics in the research process means conduct or an expected social norm of behaviour while conducting research (Li, Liping & Khan, 2018). According to Kumar (2019), "ethics is the moral principles of professional behaviour that are regarded as desirable." Priority was given to ethical issues in this study, which included participant confidentiality, privacy, and informed consent. After ethics clearance was obtained through the University of Cape Town (Appendix

A) Permission was obtained through ethical clearance with the KwaZulu-Natal Department of Health and the University. The researcher conducted interviews with nurses and records workers but did not obtain access to medical records.

i. Informed consent- the participants in this study were told the purpose of the research and their consent was requested prior to commencing the collection of data. They were assured that they were free to take part or not to take part in the study.

ii. Confidentiality- the confidentiality of the participants and the data collected was respected. The participants were assured of the confidentiality of their views through the anonymisation of research data collected and that the data collected was used for academic purposes only. Their personal data was not shared with third parties. The confidentiality of the data was maintained by not reporting the actual names of the participants and personal information collected in the consent process was stored separately from the data. The researcher coded each interview participant as interview A, B, and so on. The questionnaire did not request participants to share their identities.

iii. The participants' right to privacy was respected by ensuring that their names were not publicised and the findings would not be traced to them.

iv. The researcher respects intellectual property rights and sought ethical clearance from the University of Cape Town before commencing the data collection. Furthermore, permission to conduct research at the health care facilities was sought through the district and provincial health offices of the Department of Health in KZN.

3.10 Chapter Summary

This chapter aimed to give an outline of the research methodology that was used for the study. The study adopted a mixed method approach utilising a multiple case study as a research design. The population of the study was made up of nurses, records, and administrative staff within the three clinics in Hammarsdale which are namely; Peaceville, Mpumalanga and Hlengisizwe. The study employed convenience, expert, and self-selection sampling techniques to select the participants of the study. The chapter also outlines the data collection instrument

the collection procedure and the data analysis process. The chapter also gave the ethical consideration that needs to be observed during data collection.

Chapter 4: Data Presentation and Analysis

4.1 Introduction

The previous chapter discussed the methodology that was followed by the researcher in collecting data for the study and the current chapter will present and evaluate the study conclusions that arose from the gathering of the data. The data was collected using questionnaires and interviews from the participants at the selected clinics in Hammarsdale. The researcher used figures, tables, and explanations to analyse and arrange into easier-to-read reports. The findings are presented as guided by the research objectives. The interviews were presented using descriptive narratives and the findings were not presented sequentially but were analysed simultaneously according to the themes.

4.2 Response Rate

The study's population for questionnaires was 179 nurses in the selected clinics across Hammarsdale. The study targeted 20% of the total population to make 36 nurses across all clinics with 12 per clinic. A total of 20 questionnaires were returned in good condition and 16 of the distributed questionnaires were not returned, giving a response rate of around 56% of the target. None of the returned questionnaires were spoiled or unfilled. There were also questionnaires that the nurses wrote their details on to be contacted but the details were not clear and, in some cases, they did not provide contact details. As such they could not be contacted for further information. In addition, some of the participants refused to be recorded and opted for providing their interview responses in writing instead, which affected the comprehensiveness and precision of the data.

The response rate below the targeted responses was attributed to the unwillingness of participants to take part in the study. Since the study aimed for a more in-depth analysis rather than quantification, the findings provided a sufficiently deep understanding of the problem

despite the low response rate. Furthermore, there was reasonable distribution of the findings across the clinics and this contributed to the findings. In addition, Cohen, Manion and Morrison (2018) argued that response rates that are above 50% are enough to allow analysis and interpretation of the findings. The responses per clinic are broken down by clinic and population in Table 4.1.

Table 4.1 Response Rate for Questionnaires

Name of Clinic	**Number of nurses**	**Target Population**	**Frequency (n)**	**% Response Rate**
Hlengisizwe	130	12	7	19.4
Mpumalanga	27	12	5	13.9
Peaceville	22	12	8	22.2
Total	**179**	**36**	**20**	**55.6%**

Out of 12 questionnaires distributed to each clinic, Peaceville had more responses with a response rate of 22%, while Hlengisizwe had a response rate of 20% and Mpumalanga had 14%. The overall response rate was 56%. From the targeted population for the interviews a total of 4 participants were accessible from the targeted 5 participants and in addition there were 2 nurses who agreed to be part of the study. This provided a total of six (6) participants interviewed and from these participants, they were representative of each clinic with the two nurses emerging from Hlengisizwe and Peaceville. The position held by the participants was explored and it emerged that the participants were mostly administrative assistants followed by records staff and nurses. There was one records staff member, two clinical nurses, and three administrative staff.

4.2.1 Length of Service of the Participants

The study looked at the length of service for the participants to determine how long they have served that clinic so as to ascertain their knowledge of the health records procedures at the clinic. The largest group of participants (7=36%) had been in service for over 15 years. This was followed by 6 on the 0-5 years range (28%), while 11-15 years and 6-10 years were represented by 5 and 2 respondents respectively (24 % and 2%). This shows a reasonable distribution of the findings across all ranges with the opposite ends of the scale represented by the largest groups as shown in Figure 4.1

The majority of the interview participants (4) have been employed at the health care facility for more than five years while the remaining two revealed that they had been employed for 3 years or less at their respective institutions. A proportionally high representation from participants who had been employed at the clinics for a long time enhances the validity of the results, as these participants are likely to be familiar with the processes and to have had the opportunity to observe process changes while having insight into causes of inefficiencies.

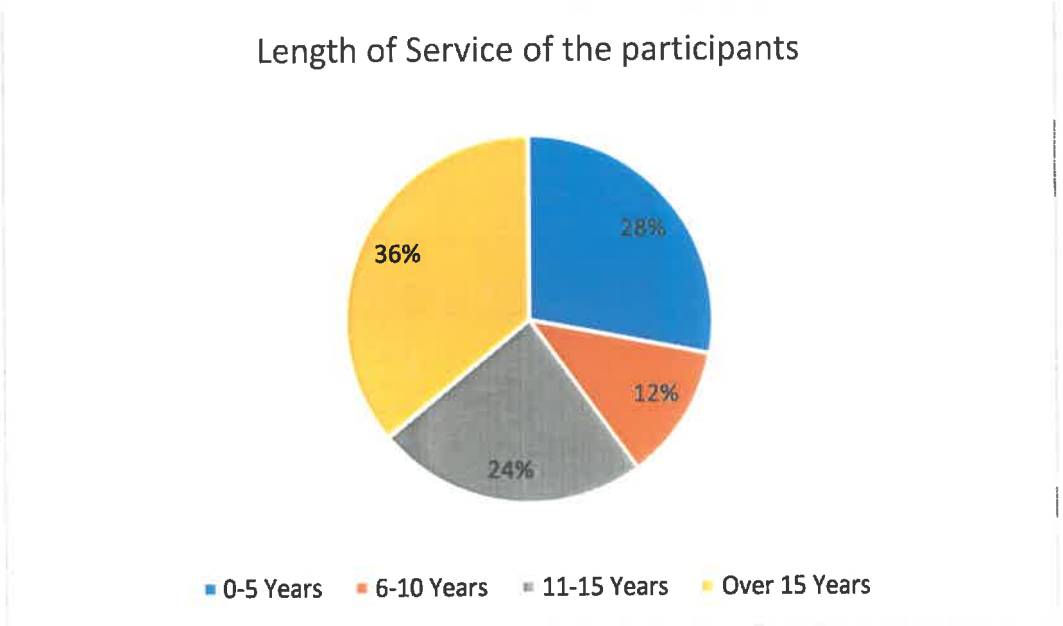

Figure 4.1 Length of Service (n=20)

4.3 Types of Records Captured

The targeted participants for interviews and those who indicated their interest to be part of the study when completing the questionnaires were interviewed. To establish the ability of staff to handle the capture and storage of patient medical records, participants were asked about the training that they have received offered by the health facility. It emerged that none of the participants had undergone training. This reveals the absence of records management training for the staff involved in handling the capture and storage of patient health information.

4.3.1 Type of Records Stored

The study looked at the types of health records that were created in primary health care clinics. Answers to the questionnaire revealed that 11 (56%) of respondents indicated that their clinics made use of patient case notes, followed by admission records with 10 (50%), ward records 9, (45%), and pharmacy records 5 (25%). The findings as shown in Figure 4.2 add up to more than 100% as the participants could provide more than one response.

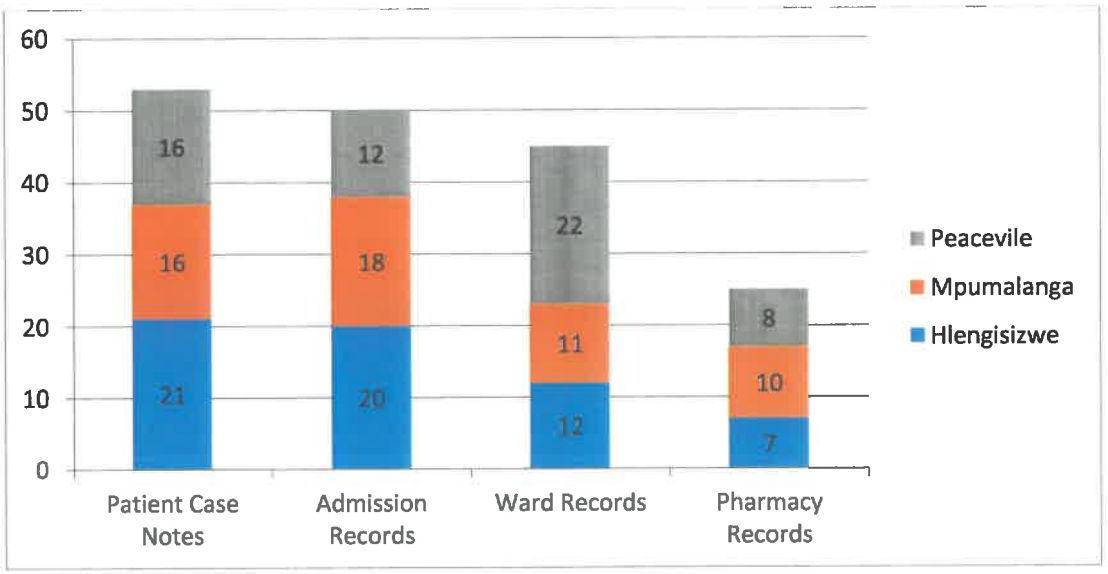

Figure 4.2 Types of Records Captured

Similar findings emerged from the interview's findings showing that patient registration records, pharmacy records, and patient case notes were the major record types that were captured. This validated the findings from the questionnaire.

4.3.2 Format in which the records are captured

The format of the records capture was investigated and the findings revealed that the use of paper records was predominant (95%). This was followed by 16 (80%) who cited that they use "*some paper, some electronic*" indicating the use of both paper and electronic records. Electronic records alone were not widely used with 5 (25%) indicating that they use electronic records. Nearly half of the participants (50%) cited that they made use of paper records that were duplicated into electronic records. The totals add up to more than 100% as the respondents cited more than one response (Figure 4.3). Apparent discrepancies can be explained by

different departments and different clinics having different processes, and some ambiguity in the question, where there may have been conceptual overlaps between options.

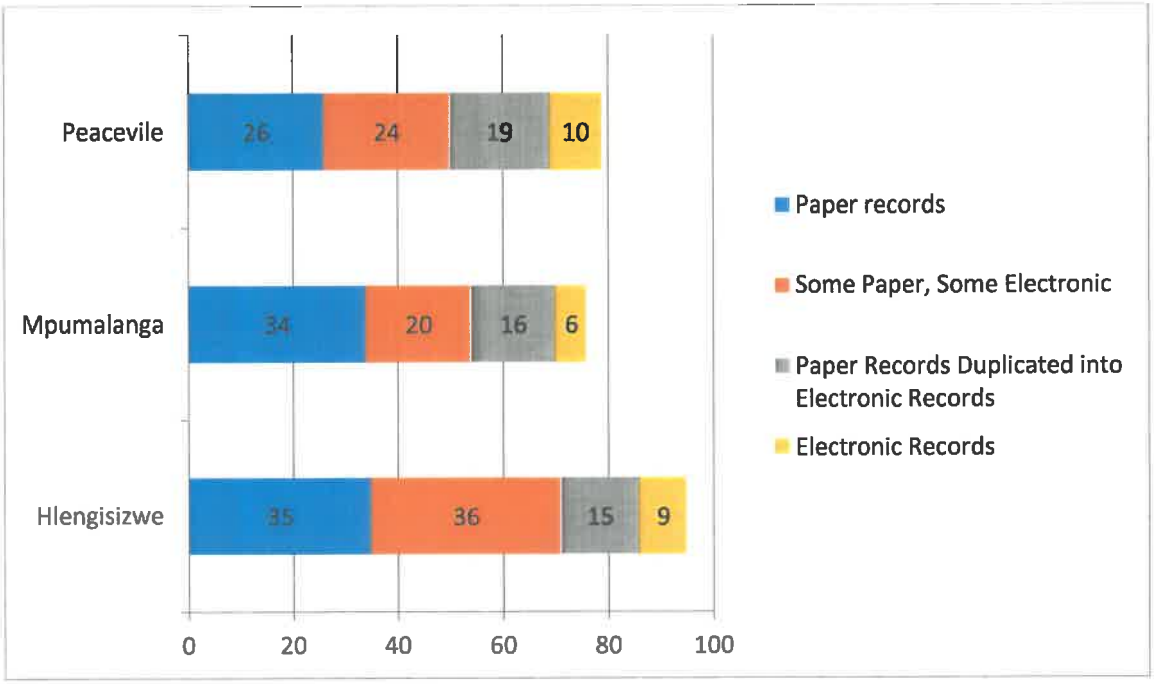

Figure 4.3 Format in which the records are captured

The interviews revealed that the records system in use was largely paper-based in conjunction with the Health Patient Registration System (HPRS). One of the participants said that *"the patients are registered on the computers using the HPRS. The patient book is then recorded with the details of the patient's visit to the clinic."* Another went on to say, "*We use the 3-tier system. The first tier is patient registration followed by the client physical book and then the details of the patient are entered in the computers if they are suffering from chronic illness.*" This points to the use of both paper and electronic records.

It was further revealed that the clinics tracked records using the file numbers on the paper records systems. One participant shared that "*each client is given a unique HRPS and once the number is entered into the system the information appears.*" This was echoed by other participants who expressed that the clinics used the HRPS numbers as identification to retrieve client information from online files. Another said that the physical files are stored in file cabinets and are organised alphabetically and these will be used to retrieve the records when the patient visits the clinics. Another explained:

"I check the date of birth, using the blue card that the patient gives me, if the patient has a blue card that means that the patient has been to the clinic before, and then I can retrieve the patient's folder (file). New files are opened for first-time clinic visits".

Another elaborated,

"We track files using surname, and date of birth as I have explained that we recently started using the new HPRS system, so we are on the physical or manual method, but the method is the same manually and electronically."

The inputs highlight the use of both manual and electronic records tracking, with a risk of the two sets of records becoming unsynchronised if one system is updated and not the other.

4.3.3 Records storage

The objective of the study was to ascertain the manner in which the records were stored in clinics. This was to set the basis for understanding the challenges faced in the capture and storage of records related to patient care in primary health clinics. Figure 4.4 illustrates that the largest number 16 (80%) of participants indicated that records are stored in filing cabinets, and 14 (70%) on shelves. In addition, there were 11 (55%) who cited that they stored them in computers.

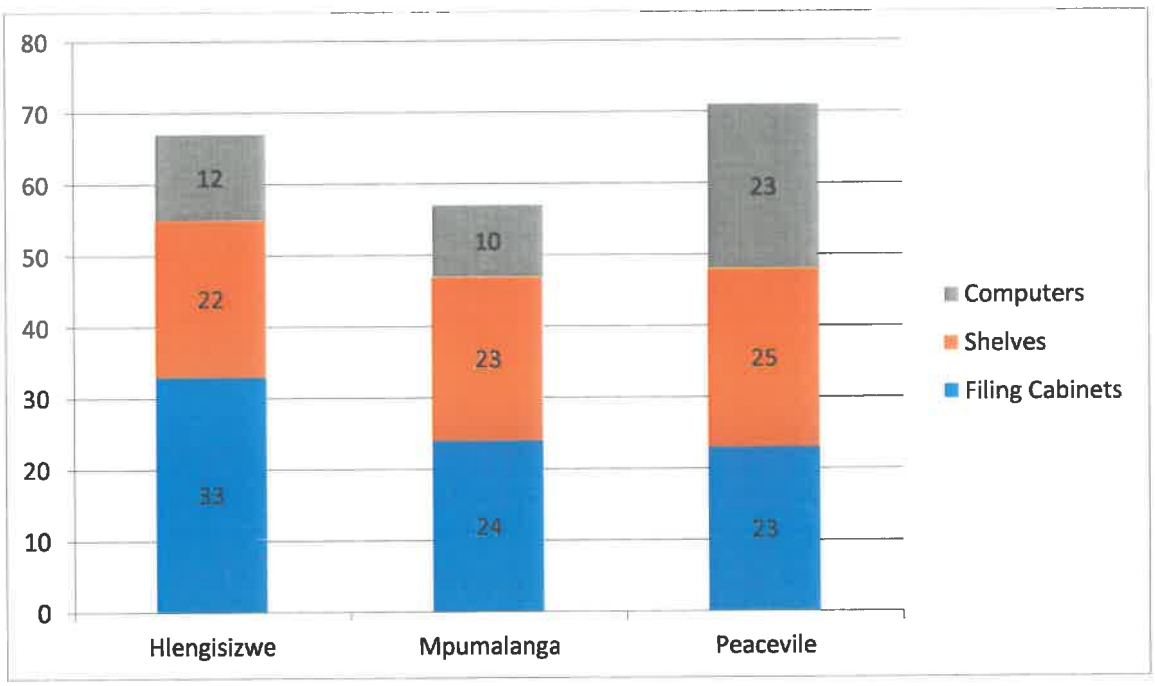

Figure 4.4 Types of records storage

4.3.3.1 Location of records storage

The study went on to explore the storage locations of patient medical records. Respondents could select more than one option. It emerged that 17 (85%) identified the registry as the place where the records were stored, while 13 (65%) cited that were kept in offices. There were 12 (60%) who indicated that the records were kept by the patients while 11 (55%) cited that the records were kept on computers. Figure 4.5 illustrates the variety of storage locations.

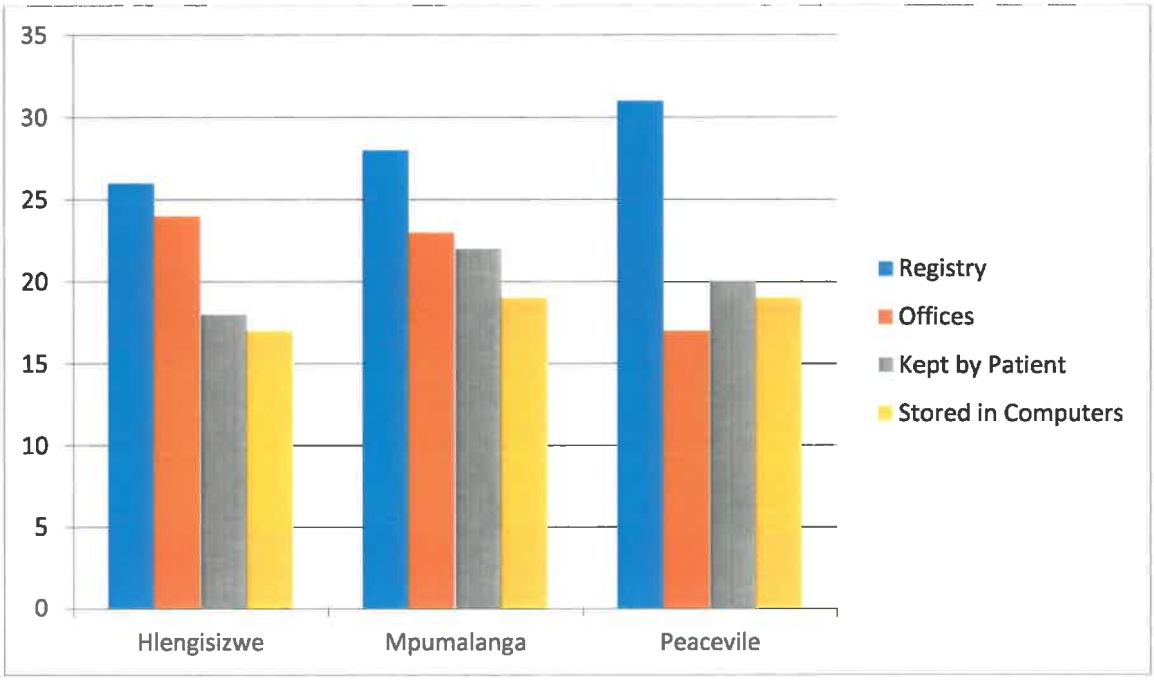

Figure 4.5 Location of records storage

Regarding the participants who indicated that the records were stored in electronic form (n=11), the study sought to identify the person who was responsible for the management of the records. It emerged that the management of electronic records was largely in the hands of the administration and records staff. There were 6 (55%) who indicated that they were managed by the administration, while 4 (36%) cited the records staff and 1 (9%) cited the IT personnel (Figure 4.6). This placed the management of the records across the clinics in various hands which makes it not clear whose responsibility was for the capture of records.

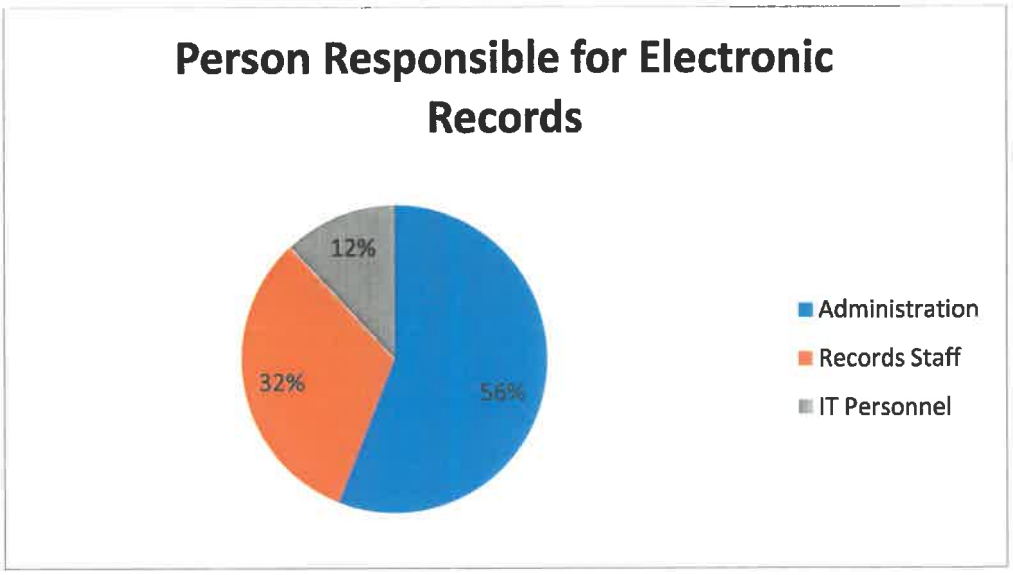

Figure 4.6 Person responsible for electronic records

Reflecting on whether the clinic should have an Electronic Records Management Service (ERMS), there was a 100% consensus that the clinics should move from manual systems to electronic systems.

In line with what the questionnaire revealed, there was consensus among the interviewees that the electronic records system was the best method. One of the participants expressed that "*storing the records in an electronic system is important as this can help in making the records nationally acceptable. This will allow the records to be shared within the health care institutions.*" However, some indicated that they were satisfied with the current system of using both paper and electronic records. One stated "*The current system is fine because we are able to capture all the patients' details except for the inside content (medical consultation information). This makes it easier to retrieve.*" Another explained that, while the physical filing is outdated, "*we cannot do away with it due to various challenges that come with electronic records. Thus, we need them to complement the electronic records.*" The responses seem to indicate that participants feel that the use of both paper and electronic records is the best means of storing patient information.

4.4 Policies and Guidelines Used

The study sought to establish the policies and guidelines that were followed by the clinics in the management of health records. The intention was to establish if there were policies and guidelines that facilitate the management of health care records. The questionnaire posed the question of whether the participants were aware of the existence of policies and guidelines on how patient records should be created and stored. There was a 100% consensus and the findings revealed that the participants were aware of the policies and guidelines.

The interviews also revealed that there were policies and guidelines that were used to facilitate the capture and storage of records in the clinics. However, the participants were not aware of the actual policies in place. One noted, *"The policy I am aware of is the internal policy on capturing records although am not using it often."* Another went on to say, *"Even if we have, I do not know maybe my manager knows about the policy."* It appears that while participants were aware of the policies, they could not articulate what they were. This does not match the findings from the questionnaire where the participants responded to the question on the policies and guidelines that were followed in the clinics. Eighteen (92%) participants said that they followed in-house methods. In contrast, 13 (68%) cited that they followed the National Department of Health records policy. There were no responses for other government policies and the participants could choose more than one option (see Table 4.2)

Table 4.2 Types of Policies and Guidelines

Types of Policies and Guidelines	**Frequency (n=20)**
Inhouse Policies	18 (92%)
National Departments of Health Records guidelines	13 (68%)
Other Government Policies	-

The study went on to look at whether the use of policies and guidelines can help in ensuring the patients' records are created and stored correctly. There was consensus among the responses with the majority citing that the policies were useful in minimising errors, ensuring standardisation, and promoting efficiency in record keeping. In comments on the questionnaire, one participant highlighted that *"policies and guidelines are essential in creating a (sic)*

standardised records systems." Another said that "*They will improve the records-keeping system and prevent loss of records*". Furthermore, one said that "*patient records are correctly filed to prevent misfiling and missing records.*" Thus, it appears that the record-keeping policies and guidelines are taken seriously by both nurses and non-nursing staff in the clinics, although there does not seem to be much awareness of other relevant requirements such as the Protection of Access to Information Act and the National Archives Act.

In order to get a comprehensive understanding of the application of policies and guidelines in the capture of records, the researcher explored the procedures for capturing and storing health care records. Once again, the findings pointed to the use of a dual or duplicate system where paper records are created alongside electronic records. According to one of the participants, "*Before I capture, I have to check if the patient is on the system or not. If I don't find the patient I create or add the patient as a new patient then add all the details, address, contact number, and ID number. I create those for the HRPS and the patient card.*" On being prompted whether it was compulsory for them to create the paper and electronic files the participant revealed "*Yes, I create an electronic file for the patient then create a physical folder (file) that the patient will take to the Nurse (medical consultation) then return it and I place it back on the shelf.*" The patient registration systems therefore capture the personal details of the patient whereas the paper records capture the patient medical information and these are stored in patient files and in their cards. One of the participants said that "*We capture all the patients' details except for the inside content (medical consultation information)*". Parallel systems therefore capture different information.

4.5 Challenges in the capture and storage of records

Various challenges affect the ability of health care clinics to capture and store patient-related records. The participants were asked to state the challenges that faced in the capture and storing of patient information. Missing files were identified as the major challenge (18 of 20 responses) by the participants, followed by misfiling which had 17, incomplete patient information at 16, and a shortage of filing space at 14. Inadequate skills of staff as well as lack of awareness of proper records storage procedures had limited responses with 10 and 8 responding to this respectively. The findings are shown in Table 4.3. There was consistency among the responses

across the clinics on the challenges faced in the capture and storage of medical records. Few participants responded against the given responses. The findings were confirmed with interview question number 11.

Table 4.3 Challenges in the Capture and Storage of Records

Challenges Faced	**Frequency (n=20)**
Missing Files	18 (90%)
Misfiling	17 (85%)
Shortage of Filing Space	14 (70%)
Inadequate Staff skills or Training	10 (50%)
Lack of awareness of proper records capture and storage procedures	8 (40%)

When asked if they had any other comments, there were a few responses that cited the lack of adequate infrastructure and the inability of staff to use the ICTs as the challenges that the clinics faced. This led them to prioritise paper-based records. One of the participants emphasized that "*patients' records must be stored in a single place and not in many places. We have a need for more space and staff.*" This was echoed by another who indicated that "*poor storage of records is what causes the misfiling and missing records, there is a need for improvement so that records are stored in one place*".

Interviewees were asked to describe the challenges that were faced in managing the health care records at the health care clinics. The major challenges that emerged were misfiling and misplacing of records. One of the participants highlighted that

We have many challenges, but mainly the misfiling and files getting lost. Sometimes it will take 2 hours to locate the file. Sometimes we will have to interview the patient to trace back the steps from the last visit, and maybe the file was left at the pharmacy because the medication was not in stock then the patient will have to come back and collect the medication, then the file will remain in the pharmacy.

Another mentioned that the records are often misplaced because of the system of storing them in many places. Space was a major challenge faced in storing records which resulted in the records being stored in many places.

Space is the major problem, as you can see now, we have boxes on the floor and outside the cabinets. Some of the files are stored outside the administration office and some are stored in a container outside the clinic main building. So, when we have to retrieve a file we must walk a lot.

According to another participant this storage problem "*is now a health hazard, if the clinic catches fire it will quickly burn due to the high number of paper records that are lying around.*" This highlights a serious problem of managing the storage of the paper records. It was further revealed that the records move through many departments. While the records for general illnesses were captured in paper format, for patients with chronic illnesses it was a 3-tier system. As one of the participants said:

"*The other challenge is that for patients who collect ARVs, their files have to be captured by the Data Capturers first before they are returned to the administration office for filing, but if the Data Capturers haven't captured the file yet, the file cannot be returned so it will be still there when the patient returns sooner than the expected date*".

This prompted a question of whether there was data capture involved in the capturing of information, and it was ascertained that the Data Capturers were used for patients with chronic illnesses. They expressed that, "*Yes, Data Capturers record or capture ARV files*".

Although all participants in the questionnaire agreed (as shown in section 4.3.3.1) that there should be a move to an ERMS, there was a lack of consensus on whether ERMS can help solve some of these specific issues as 8 respondents indicated that it would not. The reasons given were a lack of ICT skills among the staff which had 6 responses, followed by power outages and inadequate infrastructure (5 responses each). Limited bandwidth and lack of management support did not emerge as major findings in the study, with 3 and 2 responses respectively. The findings are shown in Table 4.4

When asked if they had any other comments, there were a few responses in the questionnaire that cited the lack of adequate infrastructure and the inability of staff to use the ICTs as the challenges that the clinics faced. This led them to prioritise paper-based records. One of the participants emphasized that "*patients' records must be stored in a single place and not in many places. We have a need for more space and staff.*" This was echoed by another who indicated that "*poor storage of records is what causes the misfiling and missing records, there is a need for improvement so that records are stored in one place*".

Table 4.4 Challenges in Using Electronic Records

Challenges Faced	**Frequency n=8**
Lack of skills among staff	6 (75%)
Power Outages	5 (63%)
Inadequate infrastructure	5 (63%)
Limited Bandwidth	3 (38%)
Lack of Management Support	2 (25%)

The findings are in contrast to the findings of the interviews from the interviews where participants were in favour of electronic records management systems to help solve some of these challenges. One of the participants said,

I think electronic records can help solve the space challenges as well as assist with the workload of capturing and retrieving files. We can capture all the information needed and the Nurses can also capture medical information then when the patient visits the clinic again we can simply search for his information quickly and give the patient a sticker or use a barcode to retrieve the file."

Another went on to say that "*information could be stored on the cloud and saved as backup system ensuring that even if the system at the clinic could crash they will always be backed up files. This could also save us space from the large number of accumulating files.*"

Another highlighted that "*files are kept for 15 years and the clinic does not have space, the move to a complete electronic system can deal with these challenges. In addition, there will not*

be a problem of missing and misplaced files." This suggests that the use of the ERMS may be a solution to solving the problems faced and departs from the findings from the questionnaires.

The benefits of the electronic records management system were explored and the study revealed that the major benefit is that it enables economies of space. One participant expressed that "*the clinics do not have space and the keeping of files for 15 years is aiding to these challenges. At least if the electronic system is used it can ensure that even if the files have been archived the information inside can easily be retrieved.*" Another confirmed, "*It will reduce the space challenges.*" This confirms the view expressed in the questionnaire question number 16 where it was cited that the clinics suffered from challenges of space that can be solved by storing in single space. This is where electronic records system can be beneficial. In addition, there was the view that electronic records saved time in accessing information. When asked about the strategies that could be used to overcome the challenges faced, the participants reiterated the benefits of using the electronic health records systems to minimise the challenges of lack of space and misfiling of the records. The challenges of space appeared to be a common recurring theme from both the questionnaire and interviews.

4.6 Summary

The Chapter presented and discussed the data that was collected through the questionnaire and interview methods. The Chapter presented the data that was collected using the questionnaire and the interview methods. The chapter first presented the data from the questionnaire using descriptive tables and graphs. The interviews were presented using descriptive narratives according to the themes that emerged from the data. The findings revealed that the clinics were capturing and storing both paper and electronic records. The challenges emanating from this emanate from the paper records systems. While there are benefits of using electronic records they also suffer from lack of skills of participants and infrastructure challenges. The next chapter will discuss the main findings, conclusions, and recommendations.

CHAPTER 5: DISCUSSION OF FINDINGS

5.1 Introduction

The previous chapter presented the findings from the qualitative and quantitative data that was collected using interviews and questionnaires from the clinics in Hammarsdale in KwaZulu-Natal. The current chapter will discuss the research findings in line with the research objectives. The findings will be contextualized against existing literature on challenges in the capture and storage of medical records to show how the study's findings match or depart from previous findings.

5.2 Discussion of Findings

5.2.1 Systems for Capturing Records

The first objective of the study was to assess the challenges in the systems used to capture and store patient records in the rural clinics in Hammarsdale KwaZulu-Natal. To achieve this the study first looked at the systems that were used to capture and store the patient records.

5.2.1.1 Types of Records Stored

The nature of the records captured by the clinics was explored and the indications were that the records captured by the clinics were mainly records that are related to case notes and admission records. All three clinics recorded similar findings regarding the main records captured. The findings are consistent with those of Lowe (2020) who reported that clinics in rural areas kept mostly records on patient health care which included case notes. Modise (2019) also highlighted that records were used for patient administration and were in the form of patient case notes and admission records. Furthermore, the International Records Management Trust (IRMT) (1999) pointed out that the largest part of records stored in healthcare institutions were patient case notes. This implies that the clinics recorded patient medical information in the form of doctors' or nurses' notes as well as care administered on prescriptions.

5.2.1.2 Formats in Which the Records Were Captured

In assessing the challenges that are faced by the clinics in the capture and storage of patient records it was also essential to understand the type of formats that were captured in the records systems. A combination of paper and electronic records emerged as the formats in which the records were captured. The findings point to the existence of both paper and electronic records with paper records being predominant. In addition to this, paper records were created and then frequently captured electronically in duplicate form. The implications of the findings are that the majority of the clinics were using paper records despite the implementation of the electronic records systems (ERMS). This may be due to the low adoption of ERMS in South African clinics which was highlighted by Horwood et al. (2023). This has led to the dominance of paper records despite the presence of the electronic system.

While the clinics recorded similar findings regarding the major type of records formats created and stored, Hlengisizwe reported that the majority of its records are captured in both paper and electronic form, citing the increase in the use of electronic records during records capture. This was corroborated by the interview findings where participants from Hlengisizwe highlighted the use of the ERMS known as Health Patient Registration Systems more than participants from other clinics.

It was further revealed that the clinics across Hammarsdale tracked clinical records using file numbers. The tracking of records on the online files facilitated the retrieval of paper records from the records systems when the patients visited the clinics. The patient's date of birth, surname, and HRPS numbers were used as identifiers to track the records. The IRMT (1999) argued that patient records were often kept in a file bearing the patient's name and surname and were generated when the patients were admitted. Modise (2019) also revealed the same methods were used in tracking records. This facilitates the administrative process of patient treatment as well as the management of the records in both paper and electronic formats. Thus, the process was both manual and electronic with clinics benefiting from the combination where it is used, because it facilitates retrieval of both physical and electronic records.

5.2.2 Systems for Records Storage

The manner in which the records were stored within the rural clinics in Hammarsdale was explored to set the basis for understanding the challenges faced in the storage of patient health records. The indication from the study's findings was that filling cabinets were the major storage methods used to store the records. This was followed by shelves and matched the previous findings in this study which indicated that the clinics were storing paper records. This matches the findings from the study by Payne (2015) who reported that the filing cabinets were a common storage for paper records. Similarly, Magaqa (2010) revealed that medical records were filed on designated storage shelves and cabinets. Furthermore, a recent study by Marutha (2021) also highlighted that primary health care clinics in Limpopo were arranging and storing records on patient care in files on shelves.

There was low response for computers as a source of storage for records. Peaceville had the highest rate for storage in computers with 23% while Hlengisizwe had 12% and Mpumalanga 10%. This is against previous findings where Hlengisizwe had more responses which indicated the greater use of both electronic and paper records. Mpumalanga continued to have the least responses in the use of computer records and in turn the use of computers as a medium of storage. The use of computers to store records according to Katurura and Cilliers (2018) emerged due to the implementation of the Electronic Records Management Systems (ERMS) in public health care institutions in South Africa. There is, however, limited adoption which may explain why computers are not widely used as a medium of storage.

The study findings indicate a variety of systems for the storage of health records, signalling the existence of both paper and electronic health records. There is limited consistency with the DCC lifecycle model which requires that records are created and ingested within a repository for storage according to existing standards. There were several systems that existed in all the three clinics. An understanding of these systems that are in place will facilitate the understanding of the challenges that may be faced given the lack of a uniform system for storing records. The existence of the systems represents the sequential activities necessary for the efficient management of records.

The location of the records storage was further explored and the findings revealed that the records registry was the major place where records were kept. This was followed by offices as

a place of storage as well as the patient retaining their own records. There were low responses for storage in centralised computers. The findings further indicated the existence of a variety of storage locations. These varying responses suggest that there may not be a standard policy for where records should be stored or may indicate the existence of a decentralised records system. The findings conform to the assertion by the IRMT that it was common for the medical health institutions to give autonomy to each department to manage its records.

The study's findings validated previous findings in this study which highlighted the frequency of use of paper-based records systems. This opens the records storage system to the challenges of managing paper records. Further, this evidence points to the low usage of computers to facilitate efficient storage of patient records. This mirrors the general discourse in medical health records research in South Africa where there is limited use of computers to store health records (Horwood et al., 2023; Marutha, 2021; Katurura & Cillier, 2018).

For those who indicated that the records were stored in electronic form, they further indicated that the electronic records were managed by administration and records staff. The IT personnel were not actively involved in the management of records. This supports the assertion by researchers such as Marutha (2021) and Kuturura and Cilliers (2018) that the management of electronic health records systems in South Africa was largely in the hands of inexperienced staff. This may explain the slow uptake and the heavy reliance on paper records.

The issue of using an Electronic Records Management System (ERMS) in rural clinics elicited consensus among the participants who believed that the clinics should all move to online systems. An online health records storage system can enable the clinics to be able to realise the objectives of the National Health Insurance (NHI) which is a national strategy by the South African Government to ensure that there is universal access to health through the e-Health system. Despite this, there was a preference among the participants for paper-based records. Marutha (2021) explained that paper records were seen as the only reliable source of patient medical histories. In addition, Modise (2019) highlighted that patients carried their records with them to seek health care in other local clinics. This provided justification for the use of the duplicate records storage system across the rural clinics.

5.2.3 Policies and Guidelines for the Capture and Storage of Records

Policies and guidelines impact how records are captured and stored in both a paper and electronic environment. The DCC lifecycle model advocates for the use of policies and standards in the capture and storage of records throughout their lifecycle. In this regard, the policies and guidelines underpinning the capture and storage systems were explored. The participants in the study were aware of the existence of clinics' policies in relation to the creation and storage of patients' health records. However, interview findings revealed that the participants were not aware of the actual policies in place which contradicted the findings from the questionnaires where participants indicated they followed in-house methods and the Department of Health records policy. This indicates a lack of knowledge of the other government policies on the care of health records which may improve the capture and storage of health records. The findings complemented the findings by Marutha (2018) who revealed that in health institutions in South Africa, the challenge was officials who did not understand the policies.

The importance of policies and guidelines was explored and revealed that they can ensure the proper capture and storage of records. The existence of policies was seen as leading to standardisation, increasing efficiency, and minimising errors in the records-keeping system. The study by Marutha and Ngoepe (2018) also highlighted similar findings where the existence of policies and guidelines was important in the operating environment of the health care records system. They alluded to issues of misfiling, missing files, and theft of records as problems that can be caused by a lack of policies and guidelines in the capture and storage of records. The current study's findings indicate that the participants were well aware of the need for policies and guidelines to facilitate the efficient capture and storage of patient records. However, there is a lack of awareness of the major policies governing record-keeping within the health sector.

The application of policies and guidelines in the capture of records revealed that the clinics in Hammarsdale used a dual or duplicate system. That is the use of both paper and electronic systems. This validates earlier findings on the existence of both paper and electronic records capture and storage systems. This was highlighted by Masuku and Ngulube (2020); Ngoepe and Marutha (2018) and Marutha (2021) who reported on the functioning of a dual records system within the healthcare system in South Africa. This system involves the recording of the patient details in the electronic system as well as the patient card. This means that there is a

parallel creation of records, with the electronic health record being created and a duplicate physical records file for the patients. However, clinics like Hlengisizwe created paper records that were later captured into the system as electronic records. The parallel system captured different details of the patients. The electronic records were used for general biographical details of the patient while doctors' and nurses' notes were captured physically in the paper record which was either stored by the clinic or the patient. This can lead to challenges when files cannot be located and the clinic has only access to patient details and not their case files. Luthuli (2017) highlighted this duplication of records and the consequences for the retrieval of records. While duplication can serve a useful purpose in creating information redundancy and in generating reliable unique identifiers for records as explained in Section 5.2.1.2, the risk of duplicate records becoming de-synchronised and therefore unreliable is high.

5.2.4 Challenges Faced by the Systems

The major objective of the study was to identify the challenges in the capture and storage of patient medical records in the rural clinics in Hammarsdale. The study's findings pointed to a variety of challenges that affected the ability of the clinics to effectively capture, store, and manage the records for efficient patient care. The major challenge faced was that of missing records. This was expressed by the survey participants and the interviewees who highlighted the issue of files getting lost or missing from their location. This was attributed to records being stored in several locations. Similar findings emerged from the study by Luthuli (2017) where the participants in the study lamented poor service delivery due to records that often went missing. Luthuli (2017) further highlighted that patient often steals their records to avoid going through the patient registration process. This affected the efficiency of the records systems as it increased the time taken to serve patients, led to duplication of efforts as well as affected the delivery of health care as the doctors did not have a record to rely on. This compromises the health of communities in the rural areas.

Misfiling also emerged as a major challenge that was faced within the rural clinics. This is a trend where files are not properly filed according to file plans which often leads to records not being located where they should be. This means that records cannot be easily located and retrieved. The issue of misfiling of records has been widely reported in South African health care records research. Marutha and Ngoepe (2017) reported that the challenges in efficient

health record-keeping were hampered due to the misfiling of records. This was attributed to the health care records being managed by unqualified staff. The issue of unqualified staff has been alluded to in this study as the care of the records was the responsibility of a variety of staff members. This may explain the existence of misfiling as the records will not be filed according to proper records classification systems.

The questionnaire revealed that incomplete patient information was a challenge that the clinics faced. However, this was not confirmed by the interview findings. The issue of patient information that is not complete can lead to a lack of proper diagnosis. Maphumulo and Bhengu (2019) reflected on the incidence of malpractice and negligence within the healthcare sector in South Africa. Poor recordkeeping was identified as a challenge to efficient healthcare. This can be attributed to incomplete patient information on the patient health card which leads to inaccurate health diagnosis.

A shortage of filing space emerged from the questionnaires and was validated by interview responses. Furthermore, when participants were asked to highlight other comments the issue of shortage of space also emerged. The participants in the interviews also elaborated that the clinics were overcrowded with files that could not be filed due to lack of space. This pointed to a lack of proper storage facilities in the clinics which resulted in records being stored in many places, contributing to the problem of misfiling and missing records. Luthuli (2017) highlighted this challenge as a problem that was faced by health care institutions in the KwaZulu-Natal area. The current study highlights the problems of records storage and further points to the lack of disposal policies.

Related to this issue of space was the fact that records moved across many departments which affected the ability to track the records and may lead to missing files as the records will be stored in many places. Of note were the records on HIV-related ailments where the patient records needed to be captured into the system before being filed. This points to the existence of parallel records processes that are not uniform and further provides an understanding of why the clinics faced challenges in the management of records. Furthermore, there were data capture clerks involved in capturing the details of patients with chronic illnesses. These findings emerged from the participants at Hlengisizwe and were not corroborated by other participants in other clinics.

The challenge of inadequate staff skills and training was also noted. In addition, there was a lack of awareness of proper records capture and storage procedures. The latter can be attributed to be the former as the employees may lack skills as they have not received training. This issue of training also emerged in the interviews where the participants were asked if they had undergone training and they highlighted lack of training. This implies that without proper training staff may not be aware of how to handle the records which they create and store in the clinics.

The challenges faced in the capture and storage of records within the rural clinics highlight the need to move to an Electronic Records Management System (ERMS) that can remove the problems that were faced by the clinics which include misfiling, missing files, and the problems of limited space for storing the paper records. There was consensus among the participants that the move to an electronic records system would be a welcome move. However, there was a lack of consensus on whether such a move could lead to the solving of the challenges faced. This was due to a variety of reasons that were cited and this includes lack of ICT skills among the staff members. The lack of ICT skills can lead to low uptake of the ERMS as staff will opt for paper records systems. This has been widely cited in the literature as a challenge that affects the use of electronic records among staff in health care institutions, thus affecting its implementation and uptake by staff members (Garba & Harande, 2018; Marutha & Ngoepe, 2017).

Power outages were also cited as challenges affecting the use of electronic records systems. The ERMS relies on connectivity which is powered by electricity. The absence of this affects the use of the system as the clinics cannot function without power. Marutha and Ngoepe (2017) also cited this as a common challenge in the adoption of electronic systems within health care institutions. Horwood et al. (2023) also indicated power supply as a challenge which often led people to resort to paper-based records.

Furthermore, the issue of inadequate infrastructure also emerged from the study as a challenge that affects the use of electronic records systems in the capture and storage of patient records. Infrastructure includes computer hardware and software used in the capture and storage of records in electronic form. Access to this in rural areas which are often lagging behind in development can prove to be a challenge. The inadequacy of infrastructure has emerged in literature as hindering the effective implementation of the electronic records systems leading

to the continuance of the paper-based system. The current study confirms the general discourse on the limited use of e-record systems. Without proper infrastructure, they will revert to paper paper-based system. In addition to this was the issue of limited bandwidth which affected connectivity. However, this did not receive significant responses in this study along with a lack of management support as a specific challenge.

Horwood et al (2023) summarised that the challenges of using electronic health technologies in support of clinical care in rural areas have led to the continuance of paper health records. The study revealed that the ERMS can support clinicians in making evidence-based decisions making about patient management in primary health care clinics in South Africa, However, there were challenges of lack of computer skills, limited technical support, and perceptions by the users that ERMS disrupted work with patients, thereby negatively affecting the adoption of the ERMS. These factors were a disincentive that often led users to revert to the paper-based methods which were quicker than ERMS given the challenges faced. This validates the findings obtained in this current study on the challenges in the use of electronic records.

The participants who considered the ERMS as being beneficial to the clinics were supported by the interview findings where participants were highly in favour of the use of electronic records systems. The participants cited that the ERMS can assist in dealing with space challenges as well as reduce time spent in the capture and retrieval of records. This was seen as making the process of accessing and retrieving information easier. Furthermore, it was seen as a move that could also solve problems within the clinic's records-keeping system. These sentiments were further echoed when the same participants were asked to highlight the benefits of using the ERMS for the clinics. The participants went on to conclude that these benefits provide the motivation for the implementation of the electronic health records system. This was seen as providing a strategy for overcoming the challenge faced by the clinics in capturing and storing the patient medical records.

5.3 Interpretations of the Findings

Based on the findings that were discussed in the section, the following interpretations of the findings are made. The interpretation will be guided by the main research objectives and the conceptual framework of the study.

5.3.1 Challenges in the Systems that Capture and Store Records

The first objective of the study was to identify the challenges in the systems that capture and store records in the rural clinics in Hammarsdale. The study revealed that the rural clinics operated a duplicate system for the capture and storage of patient medical information. This implied the capture and storage of both paper-based and electronic-based records. The existence of duplicate systems meant that the clinics were hampered by the challenges of capturing and storing records in parallel systems. This is despite the implementation of the electronic records management systems in the clinics. The ERMS was implemented to ensure the efficient capture and storage of the records. However, evidence points to the records systems being affected by various challenges. There are challenges with the paper-based systems on one hand which leads to misfiling, missing files, and lack of storage space. This can provide the basis for the adoption of the electronic system to counter these challenges. Despite the existence of electronic systems, there is a strong reliance on the paper-based system despite the inefficiencies identified. These include lack of skills, power outages, lack of infrastructure, and the absence of standard policies for the capture of electronic records as well as their storage. The dominance of the paper records systems exacerbated the challenges faced, requiring a policy shift to address these challenges.

5.3.2 Challenges in the Policies and Guidelines for the Systems that Capture and Store Records

The second objective of the study focused on identifying the challenges in the policies and guidelines for the capture and storage of patient records. The rural clinics as evidenced by the findings applied the use of in-house policies and guidelines. Additionally, there was a marked awareness of the National Health Policy on records, however, the overall indication is the lack of awareness of the actual policies in place. There is a lack of visibility of these policies as

evidenced by an absence of consensus across the clinics of a standard policy or guidelines to guide the capture and storage of the records. This resulted in a lack of standardisation of procedures across all the clinics which contributed to the aforementioned challenges in the records systems. Furthermore, the lack of awareness is a crucial factor that hampers the records systems as awareness is important for the efficient running of the systems. Hence the existence of unreliable records systems.

5.3.3 Suitability of the DCC Lifecycle Model

The suitability of the DCC lifecycle framework in the capture and storage of patient records was also a focus of the study and the findings point to the need for a framework to manage the records throughout their life cycle. The DCC model provides details on the capture and storage of patient records guided by the use of policies and standards. This is meant to ensure that appropriate standards are applied at each level of the record life. The study's findings showed the existence of a parallel duplicate records system that was being operated amidst low awareness and implementation of policies. This meant that the records systems did not apply policies which contributed to their lack of reliability. Furthermore, the systems continued to apply the paper-based system despite investment in electronic systems. Thus the DCC with its emphasis on policies and standards in all the processes involved in the management of records throughout their life cycle is needed.

However, it should be pointed out that the DCC framework is more suitable for the electronic aspect of the records systems. It may not provide substantial detail that is relevant for the management of paper records. The framework can be useful in the planning as well as the organisation of the systems' capture and storage processes. The important activities that can lead to efficient records systems can be identified and provide the basis for improvements. This will have implications for policymaking within the healthcare system. Given that the strategy for National Health Insurance rests on the implementation of an ERMS across public health care institutions, the DCC life cycle framework can guide how standards are implemented to facilitate the creation of health care records that are shareable within the health care institutions.

5.4 Recommendations

Several studies have addressed the issue of poor recordkeeping in the healthcare sector. It is therefore recommended that the management of the healthcare sector take the findings of this research into account and consider the recommendations from previous studies as well to be able to attend to these matters. This study recommends that the clinics conduct more workshops and training to increase awareness and introduce policies to the staff and the importance of applying the policies in the capture and storage of records. At the same time, staff who deal with records on a daily basis should be consulted on the obstacles that they encounter to effective medical records management. Training should include disciplined change management to help staff to adapt to changes in procedures and to address their emotional responses to these changes.

To enhance skills in handling the records that they create and store in the clinics, records management training and electronic records management, such as that offered by the Department of Arts and Culture, would be valuable. The study also recommends the use of the DCC Lifecycle Framework for guidance on how standards are implemented to facilitate the creation of health care records that are shareable within healthcare institutions. The implementation of disposal policies could also address the shortage of filing and storage spaces for records.

5.5 Indications for Further Research

The main objective of this study was to examine the challenges in the capture and storage of patient health records and the suitability of the DCC Lifecycle Framework within the context of managing patient records. Based on the findings as well as evidence from the literature, the indications are that there are persistent challenges in the management of patient records across rural clinics despite the implementation of the ERMS as part of the National Health Insurance. There is continued dominance of the paper records systems which are hampered by many challenges. This dominance is further fuelled by the challenges faced in the use of the ERMS. There is a need for a study to examine the extent to which the EMRS has been accepted and is being used to facilitate primary health care in South Africa. Evidence from such a study may

pave the way for policy improvement in the design of health record-keeping systems. This may lead to the realisation of the NHI which is being hampered by the absence of an efficient record-keeping system which has led to inefficiencies.

5.6 Conclusion

The study was able to fulfil the assumptions of the researcher that the rural clinics in Hammarsdale were facing challenges in the management of patient health records. The study initially focused on the challenges with digital records and the findings introduced the paper records systems as being part of the patient records. The study further revealed that the rural clinics operated similar systems of duplicate records systems. This fulfilled the objective of the study and provided the basis for the use of the DCC lifecycle framework. The conclusion derived from the study is that the rural clinics had not fully adopted the ERMS and operated the manual system for capturing and storing records. The study further concludes that the challenges faced imply that the clinics were not ready to fully adopt an ERMS in line with the NHI for South Africa. Furthermore, without the existence of policies adoption was a challenge. The study therefore was able to highlight the challenges in the capture and storage of patient medical records in the rural clinics in Hammarsdale.

5.7 Summary of the Findings

The chapter focused on discussing the study's findings that were presented in Chapter Four in this study. The discussion was guided by the themes that emerged from the research objectives. The discussion was done in line with various findings from the literature and showed how the study confirms findings from the literature. The study revealed the existence of dual or parallel records systems with paper records dominating the capture and storage of records. The dominance of the paper records system contributed to the challenges faced by the clinics. However, despite the benefits that were seen as emanating from the use of electronic records, the paper record was considered more reliable given the various challenges that also emanate from the use of electronic records. These provided a basis for running a parallel record system which has both advantages and disadvantages. The lack of skills among staff members caused

them to prefer the simple paper-based systems. In addition, there was a lack of infrastructure as well as constant power outages which made the paper records system a reliable source of information for the clinics over the electronic record.

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9 June 2023

Ref No.: UCTDKIS2023-03-02

Dear Mbali Mchunu,

Re: Ethics approval for master's research (MPhil specialising in digital curation)

I am pleased to inform you that ethics clearance has been granted by an Ethics Review Committee of the Department of Knowledge and Information Stewardship on behalf of the Faculty of Humanities, University of Cape Town, for you to proceed with collecting data for your master's study titled 'Investigating challenges faced by clinics in rural KZN in the capture and storage of digital information.

'.

We wish you well with your data collection and the completion of your research.

Yours faithfully,

Dr Mzwandile Shongwe – Ethics Committee Chair

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:

Physical Address: 330 Langalibalele Street, Pietermaritzburg
Postal Address: Private Bag X9051
Tel: 033 395 2805/ 3189/ 3123 Fax: 033 394 3762
Email:

Health Research & Knowledge Management

NHRD Ref: KZ_202306_024

Dear Ms M C Mchunu
(UCT)

Approval of research

1. The research proposal titled **'Challenges in the capture and storage of digital information by rural clinics in Hammarsdale, KwaZulu-Natal Province'** was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **approved** for research to be undertaken at Hlengisizwe, Mpumalanga and Peaceville clinics.

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

For any additional information please contact Dr. G Khumalo on 033-395 3189.

Yours Sincerely

Dr E Lutge

Chairperson, Provincial Health Research Committee

Date: 04/07/2023

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

DIRECTORATE: DISTRICT DIRECTOR

Physical address: 83 King Cetshwayo Highway, Highway House; Mayville 4091
Postal Address: Private Bag X54318, Durban 4000 eThekwini District Office
Tel: 031 240 5309 Fax: 031 240 5550 Email:
www.kznhealth.gov.za

Enquiries: Ms O Magwaza
Date: 03/07/2023

Dear M Mchunu
Faculty of Humanities

RE: SUPPORT FOR RESEARCH STUDY ON THE CHALLENGES IN THE CAPTURE AND STORAGE OF DIGITAL INFORMATION BY RURAL CLINICS IN HAMMARSDALE, KWAZULU-NATAL PROVINCE

I am pleased to inform you that the District is granting you support to conduct the research study titled, 'Challenges in the capture and storage of digital information by rural clinics in Hammarsdale, KwaZulu-Natal Province.'

Please note the following:

1. Please ensure you adhere to all the policies, procedures, protocols, and guidelines of the Department of Health concerning this research.

2. This research will only commence once this office has received confirmation from the provincial health research committee in the KZN health department.

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

4. The District office/facility will not provide any resources for this research.

5. You will be expected to provide feedback on your findings to the district office/facility

Thanking you,

 PP (Acting District Planner)

District Director, eThekwini District

Sincerely

Appendix D: Request for permission to conduct research at the research site

KZN Department of Health
Highway House 83
Jan Smuts Highway
Mayville, Durban
2023
12 June 2023

Dear Sir/Madam

Re: Request for permission to conduct research at the research sites

My name is Mbali Claire Mchunu, and I am a postgraduate student in the Department of Knowledge and Information Stewardship (DKIS) at the University of Cape Town (UCT). I am currently doing research for a minor dissertation for my MPhil specialising in Digital Curation. My Supervisor is Mr. Richard Higgs. I am seeking permission to do research at Hlengisizwe Community Health Centre, Mpumalanga Primary Health Care Clinic, and Peaceville Primary Health Care Clinic.

I am conducting research on the challenges in the capture and storage of digital information by rural clinics in Hammarsdale, KwaZulu-Natal. The purpose of the study is to examine the challenges that are faced by rural clinics in capturing and storing patient information to come up with solutions to help improve the management of patient records.

The research will entail collecting data from the individuals from your clinics mentioned above to participate in this study. If they agree, they will be asked to answer a questionnaire which is attached as Appendix A and be interviewed (consent form and Interview Guide in Appendix B). An invitation to participate in the research study will be posted on the nurses' notice board in each clinic (text included below). Interviews will be recorded if the recipient permits me to do so. The recipients will be required to set aside 30 minutes of their time to participate in the study, and data will be collected in their respective places of work during office hours.

Participants will be asked to give their written consent before the research begins. I will strive to ensure that the information they provide is treated confidentially. No names will be mentioned in the reporting of any data collected.

The Ethics Clearance Letter (reference number UCTDKIS2023-03-02) from UCT is attached as App. A.
As this is a minor dissertation there is no formal research proposal, but I would be happy to submit to you my Research Summary that was submitted to the UCT Ethics Review Committee for my research ethics if required. It contains a full outline of the research questions, the methodology, and the sampling methods.

I, therefore, request permission in writing to conduct my research at your clinics. Please let me know if you require any further information. I look forward to your response.

Yours sincerely,

Mbali Claire Mchunu Cell: 073 393 8643 Email: mkhmba018@myuct.ac.za
Mr. Richard Higgs Email: Richard.higgs@uct.ac.za

APPENDIX E: Notice requesting participation to be placed on notice board

REQUESTING YOUR PARTICIPATION IN AN RESEARCH PROJECT ON DIGITAL INFORMATION IN RURAL CLINICS

- **Is retrieving patient files a hassle?**
- **Are you frustrated with the management of patient records? Contribute your thoughts to my research.**

If you answered yes to the above questions, you are invited to volunteer in this study which aims to understand the CHALLENGES in the capture and storage of digital information by rural clinics in Hammarsdale, KwaZulu-Natal Province. The objective of the study is to identify how digital patient records are captured and stored by clinics in Hammarsdale

Your participation in this study is voluntary. You may refuse to participate in the research and withdraw at any time. Your identity will remain anonymous throughout this research. There are no risks involved in participation, no remuneration, and no cost will be required or incentive offered to you.

If you are interested in participating in this study, the questionnaire can be collected at the nurses' station and when completed put in an envelope and placed in the box provided. The questionnaire is expected to take about 5 minutes to answer.

If you need more information please do not hesitate to contact me:

Ms. Mbali Mchunu **Email: mkhmba018@uct.ac.za**

Contact: 073 3938 643

This research study has been reviewed and approved by the University of Cape Town Research Ethics Committee

APPENDIX F: Invitation to participate in the interview

Dear (.....)

Re: Requesting your participation in a research project on digital information in rural clinics

My name is Mbali Claire Mchunu, and I am a postgraduate student in the Department of Knowledge and Information Stewardship (DKIS) at the University of Cape Town (UCT). I am currently doing research for a minor dissertation for my MPhil specialising in Digital Curation. The purpose of the study is to examine the challenges that are faced in capturing and storing patient information to come up with solutions to help improve the management of patient records.

You have been identified as a potential participant in this research because you work directly with patient records and your input will be helpful to this study, or you indicated your willingness to participate in an interview when completing the written questionnaire.
Your participation will be greatly appreciated. I will strive to ensure that the information you provide is treated confidentially. No names will be mentioned in the reporting of data.

The title of my dissertation is:

Challenges in the capture and storage of digital information by rural clinics in Hammarsdale, Kwa Zulu Natal Province.

The objectives of the study are to identify how digital patient records are captured and stored records by clinics in Hammarsdale

i. To examine if digital records are being captured and stored according to policies and guidelines

ii. To assess the efficiency of the systems used in capturing and storing digital records

iii. To recommend strategies that can be used for the efficient capture and storage of digital records

Participation:

Should you agree to participate, interviews will be arranged at your convenience and are expected to take about 30 minutes. Interviews can be held in person or online at your convenience and will take place between {date} and {date}.

Your participation in this study is voluntary. You may refuse to participate in the research and withdraw at any time. You are welcome to refuse to respond to any question you feel uncomfortable answering. Your identity will remain anonymous throughout this research. There are no risks involved in participation, no remuneration, and no cost will be required or incentive offered to you. However, your participation is crucial to this study and beneficial in helping us understand the challenges in the capturing and storing of digital information within the clinics. Should you wish to receive an electronic copy of the dissertation after its publication, you can request it during the interview.

Should you have any questions or need more information, please do not hesitate to contact me. Thank you in advance for your participation.

Please indicate by the return of email if you are willing to contribute to this valuable research, and I will make arrangements for the interview.

Contact details:

mkhmba018@uct.ac.za 073 393 8643

I look forward to hearing from you.

Yours faithfully

Mbali Mchunu

APPENDIX G: Consent Form and Interview Guide

Consent form

My name is Mbali Claire Mchunu, and I am a postgraduate student in the Department of Knowledge and Information Stewardship (DKIS) at the University of Cape Town (UCT). I am currently doing research for a minor dissertation for my MPhil specialising in Digital Curation. The purpose of the study is to examine the challenges that are faced in capturing and storing patient information to come up with solutions to help improve the management of patient records.

I will honour your time and ensure that the interview does not take more than 30 minutes of your time. You have the right to not answer any questions or withdraw from the research at any time without providing reasons. All reporting is anonymous and your views will be kept confidential.

Please indicate that you understand the above information and that you are willing to take part in the research by signing below

…… ……..

Signature Date

Do you consent to this interview being recorded?

Yes [ ]

No [ ]

Interview Questions

1. Which clinic do you work at?
2. What is your position in the clinic?
3. How long have been employed in the health facility?
4. Have you attended any records-managed training offered by your health care facility?
5. What type of records system does your clinic use?
6. What types of records are captured and stored by the records system?
7. How does your clinic track records both manually and electronically?
8. Which do you think is the best means of keeping records?
9. Are there policies and guidelines used in managing records at your health care facility? Can you explain what these policies may be?
10. Please briefly describe the procedures used to capture and store records at your facility.
11. What are the challenges faced in managing the records at your health care facility?
12. How do you think electronic records could help solve some of the challenges faced?
13. In your view what are the benefits of using electronic records systems in health care facilities?
14. What strategies do you think can help improve patient records capture and storage in clinics?
15. Do you have any further comments you would like to add or questions about the study?

Thank you for taking the time to answer my questions.

APPENDIX H: Questionnaire for Nursing Staff

My name is Mbali Mchunu. I am a student at the University of Cape Town in the Department of Knowledge and Information Stewardship. I am conducting research for my dissertation for an MPhil specialising in Digital Curation. The title of the study is **Challenges in the capture and storage of digital information by rural clinics in Hammarsdale, KwaZulu-Natal Province.** The purpose of the study is to examine the challenges that are faced by rural clinics in capturing and storing patient information to come up with solutions to help improve the management of patient records. Your participation will be greatly appreciated. I will strive to ensure that the information you provide is treated confidentially. No names will be mentioned in the reporting of any data collected.

By completing this questionnaire, you are agreeing to participate, and understand that you do so voluntarily and that you may withdraw from participation at any time. The questionnaire will take about 5 minutes for you to complete and when you are done, kindly hand it in at the office of the chief nursing assistant, where you will be provided with an envelope which you are requested to seal to protect your confidentiality.

If you wish to participate in an interview with the researcher to share your insights, there is space for you to say so at the end of this questionnaire.

If you have any further questions, kindly contact me at:
Cell: 073 393 8643 Email: mkhmba018@myuct.ac.za

Instructions
Please indicate your response by ticking the appropriate box or section, or filling in the spaces provided. Once you have completed the questionnaire please place in the envelope provided, and hand in at the office of the chief nursing assistant, where you will be provided with an envelope which you are requested to seal to protect your confidentiality.

1. Please indicate the clinic you are employed at.

Hlengisizwe	
Mpumalanga	
Peaceville	

2. How long have you been employed at this healthcare facility?

0-5 years	
6-10 years	
11-15 years	
More than 15 years	

3. What types of health records are created in your clinic (select all that apply)?

Patient Admissions	
Patient case notes	
Pharmacy records	
Ward Records	

4. In what form are the records created?

Paper Records	
Electronic Records	
Some paper, Some electronic	
Paper records are duplicated in electronic format (digitised)	

5. How are records stored in your clinic?

Filing Cabinets	
Shelves	
Computers	
Other (please specify):	

6. In which location are the patient records stored in your clinic?

Registry	
Offices	
Computers	

Records were kept by the patient	
Other (please specify):	

7. If the records are in electronic format, who is responsible for the management of the electronic records?

Records Staff	
Administrative Staff	
IT Personnel	
Don't know/Other:	

8. If you are using manual records, do you think it is necessary to move to an electronic records management system?

Yes	
No	

9. Are you aware of policies and guidelines on how patient records should be created and stored?

Yes	
No	

10. Please indicate the type of policies and guidelines that are followed

In-house records policy and guidelines	
National Department of Health records policy and guidelines	
Other government legislation	
I don't know (please specify)	

11. Do you think the use policies and guidelines can help ensure that the patient records are correctly created and stored?

Yes	
No	

Please clarify your answer if you can: _____

_____

12. What are the challenges you face in capturing and storing patient information? Please indicate by ticking the appropriate box.

Misfiling	
Missing Files	
Incomplete patient information	
Shortage of filing space	
Inadequate staff skills or training	
Lack of awareness of proper records capture and storage procedure	
Other	

13. Do you think the use of electronic records management systems can help solve some of these problems?

Yes	
No	

14. If your answer is no, what are the challenges of using electronic records systems? (Select all that apply).

Lack of ICT skills among staff	
Inadequate infrastructure	
Power outages	
Limited bandwidth	
Lack of management support	
Other (please specify)	

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15. Any other comments or information that you would like to share about the management of patient records in your clinic?

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16. Would you be interested in participating in an interview with the researcher to share your thoughts on the capture and storage of medical records in your clinic?

Yes	
No	

If yes, please supply your contact number or email address:

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Thank you for your participation and valuable contribution to my research.

Appendix I: Hammarsdale Map