The Role of SmartCare Electronic Health Records System in the Delivery of Health Services: Case of First-Level Hospitals in Lusaka District, Zambia

By

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DECLARATION

I, **Misozi Ngoma,** do declare that this dissertation is my work and has not been previously submitted for any other award, either wholly or in part, at the University of Zambia or any University

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DEDICATION

I dedicate this scholarly work to my husband, Mr. Webster Kapeshi, and my family for their constant support and prayers.

To God be the glory!

ABSTRACT

The study investigated the role of the SmartCare Electronic Health Records System in the delivery of Health Services in five (5) First-level Hospitals in Lusaka District. The study adopted a qualitative research design, where twenty-five (25) registry personnel comprising twenty-two (22) registry clerks and three (3) registry supervisors, who were deemed to be key Informants, were interviewed using an in-depth interview guide. The study sought to: (i) ascertain the registry personnel's experiences and perceptions of using the SmartCare system for managing healthcare records, (ii) determine the policy framework for managing records within the SmartCare health system, (iii) ascertain the extent to which SmartCare has enhanced service delivery, and (iv) explore the challenges faced in the implementation of the SmartCare health system. Data were analyzed thematically. The results of the study showed that registry personnel in Lusaka's first-level hospitals view the SmartCare system positively, highlighting its efficiency in record management. It enhances data accuracy, accessibility, and retrieval, reducing physical storage needs and streamlining patient registration. Research findings also showed that the implementation of SmartCare had improved operations in the healthcare system in many ways, including improved service delivery, enhanced storage of patients' records, easy access and retrieval of records, tracking of patients' medical records, and an improved referral system. The study further established that registry personnel at first-level hospitals had never attended formal records management training, and no formal ICT training was offered to records management staff in the institutions. This negatively affected the management of records in the facilities. The registry personnel at first-level hospitals were not aware of existing policies and standards for the administration of their work. The challenges faced by registry personnel regarding the utilization of SmartCare in their service delivery included system failure, erratic power supply (load shedding), lack of staff training, inadequate computers, poor network connectivity, and the unavailability of Smartcards. The study recommended that the Ministry of Health consider acquiring more computers for all registries for use with SmartCare, sensitising registry personnel on the existing e-records management policies, training the Registry Personnel in the use of SmartCare, and ensuring a constant supply of Smartcards to patients. The study suggests that hospitals planning to implement the SmartCare EHR system can use the outcomes of this study to learn lessons that would aid in successful implementation.

Keywords: Health information, Electronic Health Record System, Information Communication Technology, Paper Record System

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List of Acronyms /Abbreviations

AMPATH	Academic Model Providing Access to Healthcare
BALIS	Bachelor of Library and Information Studies
CDC	Centers for Disease Control and Prevention
EHR	Electronic Health Record
EHRs	Electronic Health Record Systems
EHMIS	Electronic Health Management Information System
EMR	Electronic Medical Record
E-records	Electronic Record
EReferral	Electronic Referral
ESARBICA	East and Southern African Regional Branch of the International Council in Archives
GDHP	Global Digital Health Partnership
HCP	HealthCare Provider
HPCZ	Health Professions Council of Zambia
HSSREC	Humanities and Social Sciences Research Ethics Committee
HIPAA	Health Insurance Portability and Accountability Act
HIV	Human Immunodeficiency Virus
ICTs	Information Communication Technologies
IDT	Innovation Diffusion Theory
IPs	Implementing Partners
IRMT	International Records Management Trust
ISO	International Organization for Standardization
JICA	Japan International Cooperation Agency

LAN	Local Area Network
MPCU	Combined TAM and TPB Model of PC Utilization
MM	Motivational Model
MOH	Ministry of Health
NHRA	National Health Research Authority
OPD	Out-Patient Department
PEPFAR	President's Emergency Plan for AIDS Relief
PHDO	Provincial Health District Office
PMTCT	Prevention of Mother-to-Child Transmission
PIN	Personal Identification Number
RCM	Records Continuum Model
SEHR	SmartCare Electronic Health Records
SCT	Social Cognitive Theory
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory Reasoned Action
UTAUT	Unified Technology Acceptance and Use of Technology
UTAUT2	Unified Technology Acceptance and Use of Technology 2
UNZA	University of Zambia
USA	United States of America
VCT	Voluntary Counseling and Testing
WHO	World Health Organisation

CHAPTER ONE: INTRODUCTION

1.0 Overview

This chapter provides the background that generated the need to conduct this study. The Chapter presents the statement of the problem, research objectives, and research questions. It also discusses the theoretical frameworks that guided the study, the significance of the study, operational definitions, and limitations.

1.1 Background of the Study

Digital technology has revolutionised the way patient records are managed and how healthcare services are delivered, replacing paper with ever-advancing digital records through copious easy-to-use and accessible media (Ali et al., 2023). Nonetheless, their adoption has not always been successful (Fennelly et al., 2020). While these initiatives have helped create an important and powerful infrastructure, they have not always been fully informed by, or designed with, the needs of patients and health professionals in mind (Ali et al., 2023).

Digitized technological advancements in the healthcare sector are currently promoting efficiency (Chakraborty et al., 2020). According to Muhaise et al. (2019), an Electronic Health Record (EHR) system is a digital method of capturing, storing, and using patient information by authorised healthcare providers to deliver healthcare services effectively. The EHR system automates access to information and has the potential to streamline workflows, enhance efficiency, and contribute to a patient-centered approach to healthcare delivery (Margam, 2023).

1.2 Importance of Electronic Health Records Systems

The EHR system enables healthcare providers to enhance the quality of care, deliver a positive financial return, easily read documentation in real-time, save storage space, reduce medical errors, and analyse patient information effectively (Thit et al., 2020). According to the World Health Organisation (WHO, 2020), achieving the desired quality of healthcare for individuals and populations requires quality services to attain such measures. The significance of the EHR system in transforming healthcare delivery cannot be overstated. Access to patient information enhances care coordination among different health professionals and promotes an integrated and patient-

centered approach (Stephen and Lawrence, 2024). The key features of electronic health records include real-time access, interoperability (the ability to share information across various health systems), and decision support tools that assist health professionals in making decisions about patient care (Stephen and Lawrence, 2024). The EHR system aims to simplify healthcare processes, improve the quality of care, enhance patient safety, and contribute to better healthcare delivery and coordination (Stephen, Jay, and Oyeniyi, 2024).

According to Margam (2023), EHR systems play a critical role in facilitating data-driven decision-making in healthcare. EHR systems provide a comprehensive and longitudinal view of a patient by capturing and storing vast amounts of patient health information, medical history, test results, treatments, and outcomes. He further argues that this wealth of data can be leveraged to identify patterns, trends, and insights that inform clinical and operational decisions. These data-driven insights empower healthcare organizations to implement evidence-based practices, improve care coordination, optimize resource allocation, and enhance patient outcomes. Furthermore, by harnessing the power of data, EHR systems enable evidence-based decision-making, resulting in improved patient outcomes. Aggregated data from EHR systems can identify patterns, track treatment outcomes, and support proactive interventions (Margam, 2023).

1.3 Implementation and Use of Electronic Health Record Systems

From the 1960s to date, EHR systems in developed countries, such as the United States of America (USA), have been in use (Net Health, 2022). Subsequently, their impact on improving the quality of healthcare has been evident in both the developed and developing worlds. According to Mamlin and Biondich (2005), the implementation of EHR systems in developing countries began in the early 2000s, driven by substantial initiatives to enhance healthcare services through digital technologies. A key milestone in this area was the establishment of OpenMRS in 2004, an open-source medical record system designed to address the healthcare needs of resource-limited settings. The concept for OpenMRS originated during a visit to the Academic Model Providing Access to Healthcare (AMPATH) project in Eldoret, Kenya, in February 2004, with its first deployment occurring in that same region in 2006.

In developed countries, where EHR systems have undergone an established implementation strategy, there is increased success and health worker satisfaction, as well as decreased delays and risks of usability being compromised (Aguirre, 2019). Nevertheless, despite increased use in

developed countries, numerous studies conducted in developing countries show that the implementation of an EHR system is still lagging (Parks, Wigand, and Othmani, 2019); therefore, many factors play a role in technology adoption and use. Studies conducted in Kenya, Ghana, Nigeria, South Africa, and Saudi Arabia indicated that EHR adoption is challenged by inadequate training (Adedeji et al., 2018), poor infrastructure (Adedeji et al., 2018), and the absence of regulations and an implementation framework (Katurura, 2019).

In Cameroon, an electronic health record called MEDCAB, a locally designed system for primary healthcare practitioners, was piloted (Williams & Boren, 2008). After four months of implementation, there was a significant increase in best practices, i.e., system prompts for measuring parameters and checking for unusual values (temperatures, blood pressures, etc.), reminders for conditions requiring special attention, and making data from previous contacts readily available.

1.4 The SmartCare Electronic Health Record System in Zambia

In Zambia, the Ministry of Health (MoH) has adopted an electronic health record system called SmartCare (MoH, 2023). SmartCare is an EHR system implemented across healthcare facilities in Zambia, designed to ensure continuity of care for all Zambians, regardless of where they access health services. According to the Ministry of Health (2008), SmartCare was selected in 2008 as the national electronic record system to be standardized in all health facilities nationwide. The system has four primary objectives: to enhance the continuity of clinic-based care, increase the privacy of sensitive medical information, reduce the paperwork burden on healthcare staff, and improve the quality of information and decision-making for patients while automating data flow into the government's existing Health Management Information System (MoH, 2008).

First-level hospitals, also known as district hospitals, were formerly urban health centers at the district level. They have been upgraded to level 1 hospitals through a collaboration between the Zambian Government and the government of the Republic of Japan, facilitated by the Japan International Cooperation Agency (JICA) in Zambia (MoH, 2023). These hospitals provide primary care services and serve as the first point of contact within the healthcare system, offering clinical support for referrals from health centers (MoH, 2023).

In the context of the SmartCare EHR system, registry personnel (registry clerks and registry supervisors) play a critical role in ensuring the system operates efficiently and effectively. Their work is essential for maintaining the integrity and reliability of health information. Against this backdrop, this study investigates the role of the SmartCare Electronic Health Records System in the delivery of health services at first-level hospitals in Lusaka, Zambia, to understand the issues arising from the use of the SmartCare system in these selected facilities.

1.5 Statement of the Problem

The adoption of EHR systems has brought about a paradigm shift in the creation, receipt, and use of records, moving from paper to digital (Tsvuura, 2022). Consequently, healthcare centers globally are leveraging e-record systems, leading to their growing dominance in many of these institutions (Randeree, 2007). It should be noted that the use of EHR systems enables hospitals and other healthcare facilities to realize the presumed benefits of providing timely, effective, and cost-efficient services Numerous studies have been conducted over the years on the importance of EHR systems (Muhaise et al., 2019; Margam, 2023; Thit et al., 2020; Stephen and Lawrence, 2024; Stephen, Jay, & Oyeniyi, 2024; Net Health, 2022; Salazar et al., 2012; Aguirre, 2019; Williams & Boren, 2008; Chaudhry et al., 2006; Ludwick & Doucette, 2009; and Fraser & Blaya, 2010).

In 2005, the Republic of Zambia, in collaboration with the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and the Ministry of Health (MoH), launched the SmartCare program (Mweebo, 2014). According to Clarke et al. (2019), this integrated EHR system was originally designed to maintain continuity in antenatal care and has since been expanded to include HIV treatment and other services. As of now, SmartCare has been adopted in nearly 1,000 health facilities, which accounts for approximately one-third of all health facilities in Zambia (Clarke et al., 2019), with the Lusaka district housing 13 district hospitals (Kruse et al., 2009). Recognizing the need for enhanced service delivery to the public, hospitals in Zambia are implementing this innovative solution to revolutionize healthcare delivery by providing cutting-edge technology to healthcare workers, enabling them to improve patient care and manage resources more efficiently.

Earlier studies on the SmartCare system (such as those by Gumede-Moyo et al., 2019; Mwanza, 2019; the Centers for Disease Control and Prevention (CDC), 2023; and Mutale, 2017). Other

studies, including Silwamba, 2019; Halubanza, Kunda, and Halubanza, 2022; Mweebo, 2014; and Ng'andu and Haabazoka, 2024), have explored various aspects of the SmartCare system in Zambia, focusing on adoption challenges, data management improvements, security concerns, and the impact of digitalization on healthcare efficiency. However, these studies did not specifically investigate the role of the SmartCare Electronic Health Records System in the context of records management at selected first-level hospitals in the Lusaka District. Against this background, this study investigates the role of the SmartCare Electronic Health Records System in the delivery of health services in first-level hospitals in Lusaka District, Zambia, to fill this gap.

1.6 Objectives of the Study

The main objective of this study was to investigate the role of the SmartCare Electronic Health Records System in the delivery of health services in first-level hospitals in Lusaka District, Zambia. The specific objectives of the study were to:

i. ascertain registry personnel's experiences and perceptions of using the SmartCare system for managing healthcare (medical) records.

ii. determine the policy framework for managing records within the SmartCare health system.

iii. ascertain the extent to which SmartCare has enhanced service delivery.

iv. explore the challenges faced by registry personnel in the implementation of the SmartCare health system.

1.6.1 Research Questions

The study was guided by the following research questions:

i. What are the experiences and perceptions of registry personnel in using the SmartCare system for managing healthcare (medical) records?

ii. What policy framework is utilised in managing records within the SmartCare health system?

iii. To what extent has SmartCare enhanced service delivery?

iv. What challenges are registry personnel facing with the SmartCare health system

1.7 Significance of the Study

This study provides an account of the SmartCare Electronic Health Records as implemented in Zambian public healthcare. It is, therefore, anticipated that hospitals planning to implement EHRs in healthcare environments similar to Zambia's can use the outcomes of this study to learn lessons that would aid in implementational success. Besides, the study could help registry clerks, record management educators, and employers understand the importance of SmartCare in managing health records. The use of SmartCare Electronic Health Records may provide registry personnel with the opportunity to meet patients' care demands with appropriate responses and enhance the record-keeping profession while reducing the loss, misfiling, and misplacement of patients' records at first-level hospitals and other public hospitals in Zambia. This argument is supported by Chaudhry et al. (2006), who asserted that EMRs such as SmartCare are expected to improve the quality of care, the effectiveness of the care process, and the affordability of human services. Furthermore, this study may be significantly beneficial and serve as a foundation for more research in Zambia regarding the management of records using SmartCare Electronic Health Records by registry personnel.

1.8 Limitations

Limitations refer to factors outside the researcher's control that can restrict the findings of the study and their relevance to other contexts (Smyth, 2004). While this study offers valuable insights, certain limitations must be acknowledged.

The study's limited geographical scope and sample size of participants restricted the generalizability of the findings; however, data saturation was achieved by continuing interviews until no new themes emerged, and purposive sampling was used to capture diverse perspectives. Additionally, the qualitative nature of the study introduced the risk of researcher bias, which was mitigated through member checking, allowing participants to review transcripts, and engaging with the supervisors to maintain objectivity. Despite these challenges, the measures taken helped minimize limitations and strengthened the study's credibility and reliability.

1.9 Theoretical Frameworks of the Study

1.9.1 Records Continuum Model (RCM)

The study was guided by an interaction of two theories, namely the Records Continuum Model (RCM) Upward (2001). According to Upward (1997), this concept emphasizes the continuous and dynamic nature of recordkeeping, illustrating how records progress through multiple dimensions of creation, capture, organization, and pluralization rather than following a linear lifecycle. Consequently, SmartCare is expected to effectively capture and handle records systematically. In line with this, Karakinos (2015) states that this theory serves as a foundation for managing an organization's digital records, as it offers an integrated and layered model to illustrate the seamless movement of records across dimensions, taking into account different facets of accountability throughout space and time (McKemmish, 1997; McKemmish, 2001).

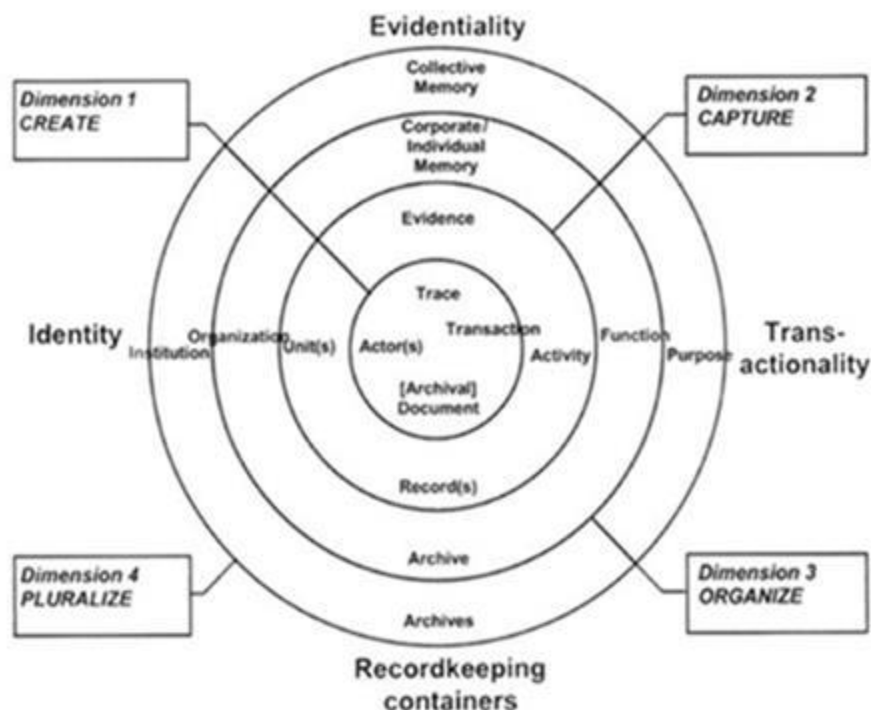

Figure 1: The Records Continuum Model Source: (Upward, 2000).

The Records Continuum Model (RCM) was developed in the 1990s to offer a post custodial and integrated approach to recordkeeping (Upward, 1996, 1997). This was viewed as a new paradigm, moving away from the traditional lifecycle model and its strict separations between records management and archives management; the continuum is more effective in tackling the challenges posed by digital records (Upward, 1996, 1997). Drawing from the theoretical principles above, recordkeeping can be briefly defined as the set of activities performed on records that provide additional context. This encompasses actions such as inputting a record into a system, updating existing information, or marking it for archival storage (Ojo and Ayoko, 2024). The Significance of Adequate Records Keeping in School Administration in Nigeria. Reading Time, 2024, 02-10. Records, regardless of whether they are in paper or digital form, must be maintained within a continuum to guarantee their long-term accessibility, dependability, and utility (Upward, 1997). This implies that records are constantly "in a state of change," as new contexts are integrated during the recordkeeping process.

1.9.1.1 Application of the RCM Framework to the Study

This theory is highly relevant to this study as it highlights the role of recordkeeping activities across a continuum. A successful health registry must ensure the reliability, authenticity, and completeness of all records whether paper-based or digital within the health sector, fostering sustainable recordkeeping practices that bridge historical data, current practices, and future needs. The continuum concept is the most effective approach for managing both electronic and paper records in healthcare facilities, as it enhances efficiency, improves responsiveness, and meets user requirements. Continuous recordkeeping practices are essential in the health sector to ensure that records are readily accessible for current organizational needs, archival purposes, forecasting, effective administration, and informed decision-making.

In this study, the Records Continuum Model (RCM) is particularly significant in the context of SmartCare, as it ensures that health records are not viewed as static documents progressing through isolated life stages but rather as dynamic entities that evolve continuously and serve multiple purposes simultaneously. By applying RCM to SmartCare, it becomes evident that records are created, captured, organized, and reused in ways that support various stakeholders, including healthcare providers, patients, policymakers, and researchers. This model also underscores the

importance of long-term recordkeeping strategies, ensuring that patient information remains accessible, accurate, and secure for both immediate medical needs and future reference. Moreover, SmartCare aligns with modern digital health initiatives, making it a vital tool for managing electronic records within an integrated and sustainable framework.

1.9.2 Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)

The second theory is the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) is an extension of the original Unified Theory of Acceptance and Use of Technology (UTAUT), which was introduced by Venkatesh in 2003. UTAUT2 has gained significant attention among researchers due to its comprehensive approach in explaining technology adoption through a diverse set of predictive variables. The theory has been extensively tested and has proven to be effective in explaining technology adoption across various industries.

UTAUT2 was developed by Venkatesh, Thong, and Xu in 2012 as a response to the limitations of the original UTAUT model, which primarily focused on how users (typically employees within organizations) adopt and use technology (Tamilmani et al., 2021). The original UTAUT model failed to adequately address how consumers (both organizations and individuals) adopt and utilize technology. To address this gap, UTAUT2 was introduced, expanding the original framework to better explain consumer behavior in technology adoption.

The original UTAUT model was built on four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). These constructs were moderated by variables such as age, gender, experience, and voluntariness of use (Venkatesh et al., 2003).UTAUT2 extended this framework by incorporating three additional constructs: hedonic motivation, price value, and habit, bringing the total number of theoretical constructs to seven. These additions were designed to provide a more comprehensive understanding of how consumers adopt and use technology (Tamilmani, 2021).

As a result, UTAUT2 serves as a valuable tool for managers tasked with evaluating the potential success of new technology implementations. By identifying the key factors that influence user acceptance, it enables managers to develop proactive strategies, such as targeted training programs

and marketing initiatives, aimed at user groups that may be less likely to adopt and utilize new systems (Azizi, Roozbahani, and Khatony, 2020).

For example, in the foundational research, the model accounted for 73% of the variance in behavioral intention to adopt technology, while it explained 52% of the variance in actual technology usage behavior (Kułak, Trojanowski & Barmentloo, 2019).

Since its introduction in 2012, the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) has been widely adopted in research to explore the adoption, use, and acceptance of technology across various domains. Its robust and comprehensive framework has established it as a critical tool for understanding user behavior in diverse technological contexts (Tamilmani et al., 2021). For instance, the UTAUT2 model has been applied to predict user acceptance in mobile health applications (Schretzlmaier, Hecker, and Ammenwerth, 2022; Dwivedi et al., 2016), education (Ates and Polat, 2025), e-commerce (Marikyan and Papagiannidis, 2023), consumer behavior in information and communication technology (ICT) (Castanha, Pillai, and Indrawati, 2021), retail technology adoption (Mookerjee and Chattopadhyay, 2022), and psychological research (García, Sarmiento, and Antonovica, 2022).

The UTAUT2 framework identifies eight key constructs that shape technology adoption and use in consumer settings. These include performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit, and behavioral intention, as illustrated in Figure 2 below.

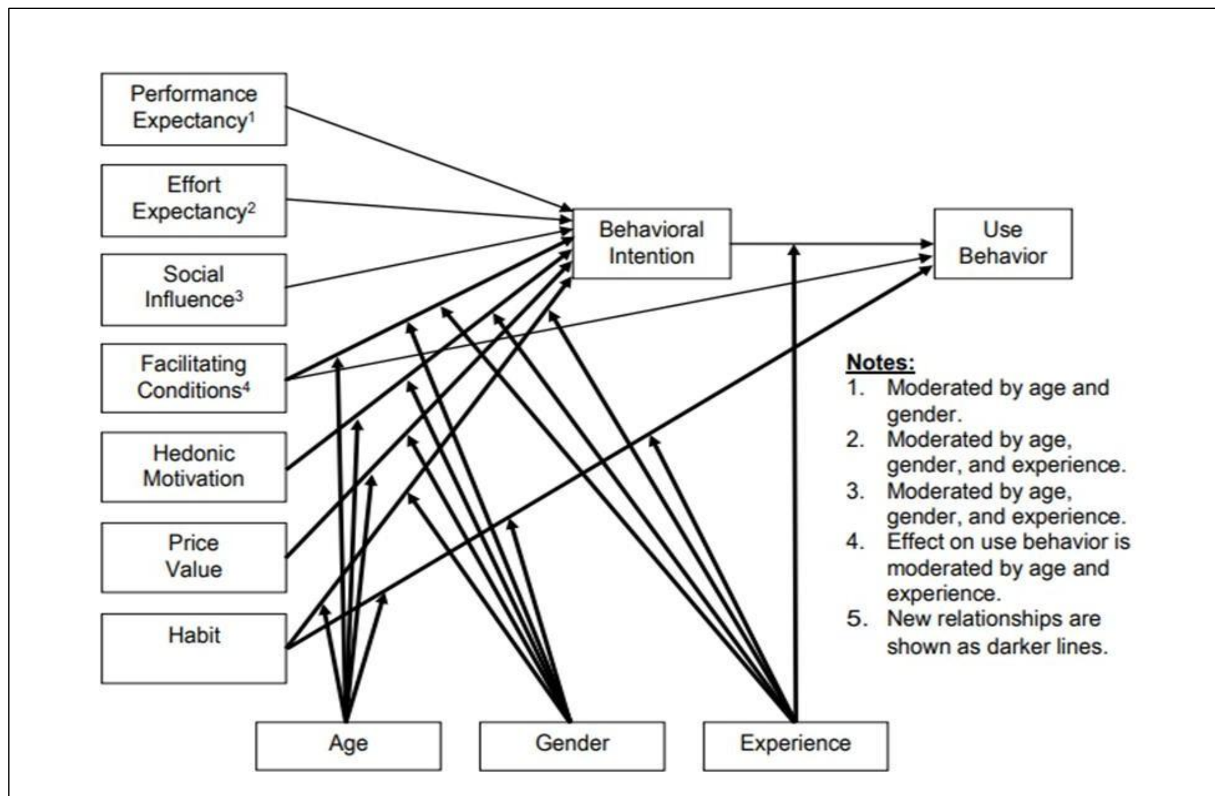

Figure 2. The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) framework was adopted from Venkatesh, Thong & Xu (2012).

1.9.2.1 Performance Expectancy (PE)

Performance Expectancy (PE) is defined as the extent to which individuals believe that using a technology will provide them with benefits in performing their daily activities. According to Maruping et al. (2017), users' expectations regarding the performance of a technology significantly influence their intention to adopt the system. A higher level of trust in the technology's capabilities can motivate individuals to continue using it over time (Dwiyanto, Elmunsyah, and Yoto, 2020). Venkatesh et al., (2003) identify five key components that contribute to performance expectancy: perceived usefulness, extrinsic motivation, job fit, relative advantage, and outcome expectations.

The first component, perceived usefulness, refers to the extent to which a technology is seen as enhancing job performance or providing tangible benefits. The second, extrinsic motivation, involves the belief that engaging with the technology will lead to specific rewards or outcomes,

such as financial incentives, bonuses, or other forms of recognition (Venkatesh et al., 2003). Job fit, the third component, relates to how well the technology aligns with and supports an individual's work tasks and responsibilities. The fourth component, relative advantage, measures the degree to which the new technology is perceived as superior to previous systems or alternatives. Finally, outcome expectations refer to the anticipated results or benefits that users expect to achieve by using the technology (Venkatesh et al., 2003). Together, these components shape users' perceptions of a technology's value and influence their decision to adopt and use it.

1.9.2.1.2 Effort Expectancy (EE)

Effort Expectancy (EE) is defined as the degree of ease associated with using a system (Venkatesh et al., 2003). In simpler terms, it refers to the level of effort users expect to exert when completing tasks with a particular system (Dwiyanto, Elmunsyah, and Yoto, 2020). Marchewka and Kostiwa (2007) emphasize that the EE construct plays a significant role in determining user acceptance of information technology. According to Elkaseh, Wong, and Fung (2016), EE comprises three key components: perceived ease of use, complexity, and ease of use.

The first component, perceived ease of use, is closely tied to the user's confidence in operating a system. Essentially, a system that is easy to use can reduce the effort required to complete tasks. The second component, complexity, relates to the challenges users may face when interacting with a system. The level of convenience can vary among users, as individuals may perceive differences in the manual effort needed when using a system, which in turn affects their understanding of it. The third component, ease of use, focuses on how technological innovations and developments influence user experiences. As systems evolve or undergo enhancements, users may experience changes in usability. Users will also evaluate whether the updated system offers improved ease of use compared to its previous version (Elkaseh, Wong, and Fung, 2016).

1.9.2.1.3 Social Influence (SI)

Social Influence (SI) refers to the extent to which individuals perceive that people who are important to them believe they should use a particular system (Venkatesh et al., 2003). This highlights how the opinions and behaviors of others can influence a user's decision to adopt or reject a system (Dwiyanto, Elmunsyah, and Yoto, 2020). Furthermore, Dwiyanto, Elmunsyah and

Yoto (2020) identify three main dimensions within the SI construct: subjective norms, social factors, and perceptions.

The first dimension, subjective norms, relates to the users perception that someone they value believes they should use a specific system. The second dimension, social factors, pertains to the influence of the user's social environment, such as peers or community, on their decision to adopt a system. The third dimension focuses on perceptions, particularly how using a system might enhance an individual's social status or standing within their community (Dwiyanto, Elmunsyah and Yoto, 2020). Together, these dimensions underscore the role of social context in shaping user behavior and acceptance of technology.

1.9.2.1.4 Facilitating Conditions (FC)

Facilitating Conditions (FC) refers to the degree to which individuals believe that organizational resources, technical infrastructure, and support systems are available to enable the use of a technology (Venkatesh et al., 2003). According to Ajzen and Fishbein (2020), this construct encompasses various factors that can directly influence actual behavior, such as the training or knowledge individuals acquire. The FC construct consists of three primary components (Venkatesh et al., 2003).

The first component is perceived behavioral control, which includes both internal and external factors, such as the availability of facilities, resources, and technological infrastructure. The second component, facilitating conditions, focuses on environmental factors that promote the use of a system, shaped by both the system itself and external influences. The third component, compatibility, evaluates how well the innovation aligns with the values, needs, and experiences of its users (Venkatesh et al., 2003). Together, these components highlight the importance of organizational and environmental support in facilitating technology adoption and use.

1.9.2.1.5 Hedonic Motivation (HM)

Hedonic Motivation (HM), as defined by Venkatesh, Thong, and Xu (2012) and Venkatesh and Davis (2000), refers to the perceived enjoyment or pleasure individuals derive from using a technology. Venkatesh, Thong, and Xu (2012) identified HM as a critical factor in shaping consumers' intentions toward technology adoption. HM comprises three dimensions: fun,

enjoyment, and entertainment. The first dimension, fun, measures the pleasure users experience while interacting with the technology. The second dimension, enjoyment, reflects the satisfaction users feel when using the technology. The third dimension, entertainment, assesses the extent to which the system provides an entertaining experience for its users (Venkatesh, Thong, and Xu, 2012).

Moreover, Venkatesh, Thong, and Xu (2012) emphasize that HM is a strong predictor of behavioral intention. For example, Khechine, Raymond, and Augier (2020) highlight that user experience plays a pivotal role in technology adoption. A positive user experience is likely to motivate users to engage with the technology more frequently, thereby influencing both the level of acceptance and the overall usage of the technology or system.

1.9.2.1.6 Price Value (PV)

Price Value (PV) is defined as the consumer's cognitive evaluation of the benefits of a new technology relative to its monetary cost (Venkatesh, Thong, and Xu, 2012). For instance, Venkatesh, Thong, and Xu (2012) explain the process by which price value influences behavioral intention: when individuals perceive that the benefits of a technology outweigh its financial costs, the technology is said to possess a positive price value. Consumers are more likely to engage with e-commerce platforms or applications if they believe that the value derived from using them, such as convenience or savings, exceeds the associated costs, such as internet access fees or the price of mobile devices. As a result, PV serves as a measure of the net benefits gained from adopting and utilising a specific technology.

This concept aligns with the idea that individuals aim to maximize net gains. If the adoption and use of a technology yield positive benefits, users are more willing to accept the associated costs (Moorthy et al., 2019; Palau-Saumell et al., 2019). Consequently, PV is included as a key predictor of behavioral intention to use a technology (Venkatesh, Thong, and Xu, 2012).

1.9.2.1.7 Habit (H)

Habit (HT) refers to the extent to which users incorporate the use of new technology into their daily routines, making it a familiar and automatic behavior (Venkatesh, Thong, and Xu, 2012).

This construct highlights the learned, automatic nature of behavioral responses that develop over time (Chao, 2019). According to Wong et al. (2014), habit plays a significant role in the continued use of information systems. When individuals use a new technology regularly as part of their daily routines, it fosters the development of habits, which in turn support the adoption and sustained use of the technology.

Research has shown that habit significantly influences behavioral intention (Huang, 2018; Tak and Panwar, 2017). This intention is formed in the user's mind, and a stronger habit leads to a more deeply ingrained intention, which ultimately shapes behavior. For this reason, habit has proven to be a reliable predictor of technology adoption, as it is shaped by prior experiences and repeated use (Venkatesh, Thong, and Xu, 2012). In essence, the more habitual the use of technology becomes, the more likely users are to adopt and continue using it.

1.9.2.1.8. Behavioral Intention (BI)

Behavioral Intention (BI) refers to an individual's willingness or likelihood to use a system (Venkatesh, Thong, and Xu, 2012). According to Owusu Kwateng et al. (2019), behavioral intention is positively correlated with user behavior across various contexts. User behavior reflects how the technology is utilized, and behavioral intention serves as a measure of the extent to which users are likely to adopt and engage with the system. As highlighted by Venkatesh, Thong, and Xu (2012), behavioral intention has a direct and positive influence on user behavior, indicating that stronger intentions to use a system typically lead to greater adoption and usage.

1.9.2.2 Application of the UTAUT2 framework to the study.

The UTAUT2 framework suggests that the successful adoption and implementation of SmartCare EHRs as an advanced technology in first-level hospitals in the Lusaka district hinges on the belief that these systems provide tangible benefits to the hospitals and align with their established values, past experiences, and specific needs. Furthermore, if first-level hospitals perceive the advantages, ease of use, and efficient functionality of EHRs, it is likely that many hospitals in Zambia will adopt SmartCare EHRs. According to the UTAUT2 framework, several factors such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic

motivation, price value, habit, and behavioral intention are critical for the acceptance and use of technology.

This implies that the perceptions of registry personnel regarding the system's efficiency, ease of use, support from colleagues and management, availability of training and resources, interaction with the system, cost-effectiveness, and the integration of SmartCare into their daily routines will significantly influence both the acceptance and overall utilization of the technology. In essence, the alignment of these factors with the needs and expectations of users will play a pivotal role in determining the success of SmartCare EHRs in these hospitals.

While both the RCM and the UTAUT2 offer valuable theoretical insights, UTAUT2 stands out as the most suitable framework for this study. UTAUT2 specifically addresses user adoption and behavioral intentions regarding technology, which are central themes in examining SmartCare utilization.

In contrast, the RCM primarily focuses on information governance, record-keeping processes, and long-term data management, making it more relevant to archival and compliance contexts rather than user adoption. However, UTAUT2 aligns closely with the study's objectives by incorporating key determinants such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit- factors that directly influence users' decisions to adopt digital health solutions like SmartCare.

Therefore, UTAUT2 provides a more robust theoretical foundation for investigating the acceptance and sustained use of SmartCare, establishing it as the most appropriate model for this research.

1.10 Operational Definition of Key Concepts

i. **Electronic Health Record System (EHRs):** An EHR system is a digital method of capturing, storing, and using patient information by authorised healthcare providers to deliver healthcare services effectively (Muhaise et al., 2019).

ii. **Electronic Medical Records (EMR):** An EMR is defined as a patient's medical and health-related history in digital format. It electronically stores all medical information regarding a patient's past and present health status and healthcare (Al-Sawad et al., 2013).

iii. **Electronic Record (E-records):** An electronic record is defined in IRMT (2009) as a digital record that is stored, transmitted, or processed using electronic devices like computers.

iv. **First-Level Hospitals:** In this study, first-level hospitals are previously urban health centers that have been upgraded to level 1 hospitals. For this research, the researcher will consider five public first-level hospitals in Lusaka (MoH, 2008).

v. **Health Record:** A health record is defined as any relevant record created by a health practitioner during or after a consultation and/or examination or the application of health management (HPCZ, 2016). In this research, the term health record is used interchangeably to also refer to a medical record.

vi. **A Policy Framework** is a document that outlines a set of procedures and long-term objectives that form the basis for defining rules and guidelines, as well as providing general guidance for the organization's planning and development (Business Dictionary, 2020).

vii. **Registry:** The term registry can be defined as a records office responsible for the receipt, control, and maintenance of current records (IRMT, 1999). Furthermore, the main function of a registry is to house the entire series of records kept in a particular organization and to maintain intellectual control over the records.

viii. **Registry Personnel:** In this study, the term "registry personnel" will be used interchangeably to refer to records managers, registry clerks, medical health clerks, and data entry clerks, as long as they are in charge of records (HPCZ, 2016). Therefore, in this study, a registry personnel member is defined as a person responsible for managing medical records in a first-level hospital.

ix. **SmartCare:** SmartCare is an electronic health record system developed in Zambia. It is a nationally scalable electronic health record system designed specifically for low-resource, disconnected settings. SmartCare aims to improve the quality of healthcare by providing support to deliver “continuity of care,” especially where existing paper systems fail to preserve a longitudinal data view and where clinics often lack telecommunications (MoH, 2008; MoH, 2023).

1.11 Summary of Chapter One

This chapter discusses the background and rationale for conducting the study, presenting the problem statement, research objectives, and research questions. It also elaborates the theoretical frameworks guiding the study, its significance, operational definitions, and limitations.

The chapter began by emphasizing the transformative impact of digital technology in healthcare, particularly the transition from paper-based to electronic health records (EHRs). While EHR systems like SmartCare have the potential to enhance healthcare delivery, their adoption has not always been successful, often due to a lack of alignment with the needs of patients and healthcare professionals. The importance of EHR systems is underscored as they enhance care quality, reduce errors, and support data-driven decision-making. However, their implementation in developing countries, including Zambia, faces challenges such as inadequate training, poor infrastructure, and the absence of regulatory frameworks.

In Zambia, the Ministry of Health (MoH) adopted the SmartCare EHR system in 2008 to standardize health records across healthcare facilities. SmartCare aims to improve continuity of care, protect patient privacy, reduce paperwork, and enhance decision-making. First-level hospitals, upgraded with support from the Japanese government, serve as primary care centers and are critical to the successful implementation of SmartCare. Registry personnel, including clerks and supervisors, play a key role in ensuring the system's efficiency and reliability.

The study investigated the role of SmartCare in delivering health services at first-level hospitals in Lusaka, Zambia, focusing on the challenges and opportunities associated with its use. The research was guided by two theoretical frameworks: the Records Continuum Model (RCM) and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). The RCM emphasizes the dynamic and continuous nature of recordkeeping, ensuring that records remain accessible and reliable over time. UTAUT2 provides a comprehensive framework for understanding technology adoption, incorporating factors such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit, and behavioral intention.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review relevant to the study. The literature review of this study is organised based on the themes derived from the study objectives. The study identified several literature sources, including journal articles, books, institutional websites, previous studies, statutory and legal documents, international and national standards, guidelines, professional groups, and academic works (thesis/dissertations).

2.2 Definition of Concepts

This section provides a foundation for understanding the scope and focus of this study by defining key terms and concepts related to electronic records and their management.

2.2.1 Records

A record is any information that is created, received, and maintained as evidence and information by an organization or individual in pursuance of legal obligations or business transactions. Records can exist in various formats, including paper documents, digital files, photographs, and audio recordings (ISO 15489-1, 2006). Van Garderen (2007) defines a record as "recorded information produced or received in the initiation, conduct, or completion of an institutional or individual activity and that comprises content, context, and structure sufficient to provide evidence of the activity." The key term in these definitions is evidence. Essentially, a record can be defined as "evidence of an event." This evidence must include content (data), a mode of presentation (context), and a clear, unambiguous logical structure. The authors argue that following these characteristics will lead to authentic records (produced by a qualified individual in the relevant field), complete (offering sufficient and indisputable evidence of the transaction), reliable (accurately representing the transaction), and fixed (remaining unchanged from its original form) (Unegbu and Adenike, 2013).

2.2.1.1 Health Record

A health record is a comprehensive compilation of an individual's medical history and healthcare information. It typically includes details such as past and current medical conditions, treatments, medications, allergies, immunizations, test results, and notes from healthcare providers. Health records may exist in either paper-based or digital formats, with the latter commonly referred to as electronic health records (EHRs).

These records play a crucial role in ensuring accurate and consistent medical care, enabling healthcare professionals to make well-informed decisions. Additionally, they serve as valuable tools for patients to track their health history. According to the Health Professions Council of Zambia (HPCZ, 2016), a health record consists of clinical information related to a patient's physical and mental health, compiled from various sources. It typically includes demographic data, next of kin details, and most of the following: medical history, examinations, diagnoses, treatments (including surgical procedures and drug therapy), and results from diagnostic investigations such as laboratory tests (e.g., biochemistry, hematology, pathology) and imaging studies (e.g., X-rays, scans).

Furthermore, health records contain alerts and warnings (e.g., allergies, blood group, mandatory medications), documentation of preventive measures (e.g., immunizations, screenings for breast and cervical cancer, and fecal occult blood tests), nursing records, clinical correspondence, referrals for treatment, consent forms for surgical procedures, operating theater reports, discharge summaries, and post-mortem reports.

2.2.2 Electronic Records

The term e-records has been defined in several ways. Kalusope (2016) defines electronic records as those that can be stored, transmitted, or processed using a computer or other electronic means. As a result, electronic records must include content, context, and structure, acting as evidence of policies, transactions, and activities carried out in electronic environments. On the other hand, Mukred et al. (2016) refer to an electronic record as any information created, used, and retained in a form that only a computer can process. These include email, text messages, disaster recovery,

backup tape, and records that exist on portable media such as memory sticks and other devices that can be read only by use of a computer. Sejane (2004) asserts that electronic records are important tools that promote improved information sharing. In any organization, electronic records are highly significant and should be given the same level of attention as other forms of organizational records. According to Kalusope (2016), effective management of electronic records enables organizations to swiftly access and identify the necessary records for their operations at any time. Furthermore, implementing strong electronic records management practices is essential for demonstrating the activities undertaken by the organization. Mnjama (2014) argues that moving from paper to electronic records offers numerous benefits over traditional paper-based systems. Electronic records allow authorised users to quickly access information from various locations, enabling immediate data retrieval. In addition, they offer several other advantages, such as the ease and speed of off-site backups for important documents, the ability to share records through an organization's intranet, and the option to provide records to clients or the public through the Internet. Moreover, electronic records can integrate workflow technologies, significantly decreasing the time required for actions related to the records and allowing for storing large amounts of information (Mnjama 2014). In this regard, Mukred and Yusof (2015) assert that effective electronic records management is essential for the efficient operation of organizations.

2.2.3 Records Management

The concept of Records Management (MA) can be defined as the field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use, and disposition of records, including the processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records (ISO, 2016). Similarly, Yusof and Chell (2000) define records management as a systematic control of records throughout their lifecycle, from creation and maintenance to disposition. It ensures that records are properly classified, stored, retrieved, and disposed of in compliance with regulatory and business requirements. According to ISO (2016), records management includes activities such as setting policies and standards, assigning responsibilities and authorities, establishing and promulgating procedures and guidelines, providing a range of services relating to the management and use of records, designing, implementing, and administering specialized systems for managing records, and integrating records management into business systems and processes. Dawha and Biu (1993)

contend that records management plays an important role in charting the course of policy and determining program priorities. It can also introduce a sense of unity of purpose into the whole administration. Thus, it seeks to create records necessary for the efficient and successful running of an organization, to produce the records when they are needed, to conserve records relevant to the continued operation of the organisation, and to create only those records that are necessary. It is, therefore, the responsibility of records management functions to develop and operate systems and procedures for creating, maintaining, and disposing of records necessary for the successful operation of an organization (Abioye & Habila, 2004).

2.2.3.1 Medical Records Management

Medical Records Management is a structured and organized approach to handling patient health records, encompassing both physical documents and electronic health records (EHRs). This process is fundamental to healthcare delivery as it ensures the accuracy, security, and accessibility of medical information, thus enabling healthcare providers to deliver high-quality, timely, and well-informed care. Efficient medical records management also plays a crucial role in meeting legal, ethical, and regulatory obligations, ensuring compliance with standards such as the Health Insurance Portability and Accountability Act (HIPAA) and various country-specific healthcare regulations (HPCZ, 2016).

One of the primary components of Medical Records Management is data collection, which involves systematically recording patient information during medical visits. This includes demographic details, medical history, test results, prescribed treatments, and progress notes, ensuring a comprehensive and up- to- date record of the patient's health status.
Storage and organization are also critical since medical records must be systematically maintained to facilitate quick retrieval when needed. While traditional paper- based records require secure physical filing systems, EHRs rely on digital databases that provide enhanced accessibility and efficiency. The transition to electronic systems has significantly improved record- keeping by reducing errors, streamlining workflows, and enabling interoperability among different healthcare providers.

Another crucial aspect is security and privacy, which entails safeguarding sensitive patient information from unauthorized access, data breaches, and cyber threats. Strict confidentiality measures, including encryption, access controls, and user authentication protocols, are implemented to protect patient data and uphold ethical and legal obligations.

Additionally, record retention and disposal policies ensure that medical records are stored for the legally required period before being securely disposed of when no longer needed. Proper retention schedules help maintain the balance between keeping essential health information accessible and preventing unnecessary data accumulation that could pose security risks.

Finally, compliance with healthcare regulations is an integral part of Medical Records Management. Regulatory frameworks such as HIPAA, the General Data Protection Regulation (GDPR), and national health policies provide guidelines for handling patient records to protect privacy, promote transparency, and enhance accountability within the healthcare sector.

In essence, Medical Records Management is a cornerstone of healthcare administration, supporting effective communication among healthcare professionals, ensuring continuity of care, and ultimately improving patient outcomes (HPCZ, 2016).

2.3 Uses of Records

Records play a crucial role in the functioning of an organization, as their absence would hinder operational effectiveness. The daily activities of any thriving organization are fundamentally reliant on the integrity and availability of its records. Numerous organizations may find it impossible to sustain their operations without the diligent preservation and utilization of these essential documents (ISO, 2016). Information is an important part of every organization; it is expected that information should be reliable, accurate, complete, precise, and sufficiently up-to-date (Ojo and Ayoko, 2024).

Emmerson (1999) outlines four main types of records used by businesses, each classified according to its purpose. These types are vital records, which are irreplaceable; important records, which can easily be moved to inactive status; useful records, which relate to everyday business activities; and non-essential records, which have no future value. Additionally, Anderson (2021) states that records are classified into several categories, such as financial, personnel, medical, and academic records. Financial records comprise documents such as invoices and receipts; personnel

records include employee files and performance assessments; medical records consist of patient histories and treatment plans; and academic records feature transcripts and attendance records. Historically, these records were kept in physical formats; however, the emergence of digital technology has significantly altered the methods of storage. Electronic records offer enhanced accessibility and security, with databases facilitating efficient organization and retrieval of information (Anderson, 2021).

In this regard, Popoola (2000) emphasizes that records are a fundamental tool for administration and essential for the execution of operational processes and functions within organizations. They act as benchmarks for evaluating an organization's performance. Additionally, records capture the results of managerial and administrative actions, thereby reflecting the overall quality of the organization's business operations. As Popoola (2000) points out, if records serve as indicators of organizational performance, it means that an organization cannot function effectively in their absence. Therefore, organizations create records for a purpose (Kalusopa and Ngulube, 2012). For example, in the healthcare sector, effective record management is vital for providing quality patient care and making well-informed medical decisions. Electronic Health Records (EHRs) serve as centralized databases for patient histories, diagnostic results, treatment plans, and prescriptions, which improves collaboration among healthcare professionals. For instance, a patient with a chronic illness like diabetes greatly benefits from comprehensive records that track previous treatments, medication regimens, and lab results. This documentation aids healthcare providers in making informed clinical decisions and minimizes the risk of medical errors. Furthermore, precise record-keeping is crucial for medical billing, insurance reimbursements, and adherence to healthcare regulations, including the Health Insurance Portability and Accountability Act (HIPAA) (Brown, Williams, and Carter, 2022).

Another dimension of use is accountability. Shepherd and Yeo (2003) emphasize that organizations utilize records to enhance accountability, particularly when it is necessary to demonstrate compliance with obligations or adherence to best practices. It is important to recognize that organizations are accountable in multiple ways: they must fulfill legal, regulatory, and financial obligations; undergo various audits and inspections; and provide justification for their decisions and actions. In this context, records serve as the main tool through which

organizations can substantiate their actions when they need to clarify their behavior. In the field of education, efficient record-keeping is vital in school administration, impacting numerous aspects of school operations such as planning, budgeting, staffing, facilities management, and discipline. School records serve as a repository of customs and traditions, offering direction to educators and school leaders. They further noted that accurate record maintenance is critical for tracking student progress and aiding administrative decision-making. Student records, which include grades and attendance, are essential for assessing educational outcomes and supporting accreditation efforts. The introduction of digital student information systems has simplified record management in educational institutions. (Gambo et al., 2022).

Furthermore, records play a crucial role in safeguarding a nation's collective memory. Those documents deemed to possess enduring significance are maintained in archives, serving as vital evidence within the historical continuum. They contribute to individuals' sense of identity and function as the documentary heritage of a nation (Roper and Millar, 1999).

2.4 Electronic Health Record Management Systems

An Electronic Health Record (EHR) system serves as the database for storing the most important medical information about patients. EHRs, commonly known as Electronic Medical Records (EMRs), are terms that many people use interchangeably (Torrey, 2011). According to Okpala (2013), an EMR system refers to an application that would aid in recording clinical data electronically, making decisions, placing and receiving orders, making requests to the pharmacy, recording X-ray and laboratory findings, and also documenting clinical activities. The development of the EHR helps medical institutions go paperless and build a highly cooperative system within the organization. It’s a comprehensive, real-time patient care record that makes information available instantly and securely to authorized users (Ludwick & Doucette, 2009).

The Ministry of Health in Zambia acknowledged the significant advantages of EHRs and formulated a strategy aimed at identifying effective methods to address the health requirements of both individuals and communities. The adoption of EHRs has facilitated improvements in health service delivery by addressing challenges related to workforce shortages, geographical limitations, and the physical inaccessibility of healthcare facilities. Furthermore, it establishes a vital

framework for the exchange of information among various stakeholders within the health system, catalyzing improved health outcomes (MoH, 2021). EHRs have transformed the organization of health documentation, thereby advancing the field of healthcare. They have facilitated the readability of patients' medical data and enabled access from virtually any location globally (Evans, 2016).

For example, Ankur (2023) emphasized that the capability of EHRs to swiftly transfer patient data between various hospital departments represents a considerable advantage. Additionally, the utilization of a digital records environment offers significant space-saving benefits. This system has the potential to enhance patient flow and productivity, ultimately allowing for the care of a greater number of patients daily. Furthermore, it facilitates improved management of medical results and care processes, which can lead to a reduction in errors within the healthcare facility. The implementation of EHRS can also result in decreased operational costs, such as those associated with transcription services and additional labor. Moreover, these digital medical records are adaptable and scalable, making them suitable for accommodating the growth of medical practices. The system includes advanced features for e-prescribing and clinical documentation, contributing to a stronger financial position for healthcare facilities by enabling more accurate data management and supporting clinical research initiatives (Enahoro et al., 2024). Globally, studies indicate that the implementation of EHRs offers numerous advantages for enhancing patient care.

In line with this, Salazar et al. (2012) observed that EHR systems present opportunities to enhance the management of healthcare provider (HCP) documentation. EHRs possess the capability to generate automatic notifications, such as reminders for follow-up actions following exposure, vaccinations, or the provision of supplementary services. Healthcare professionals (HCPs) are allowed to access information pertinent to their roles, which has been entered by various departments. This includes critical details such as job descriptions supplied by the human resources department, thereby facilitating improved communication and informed decision-making concerning HCPs. Salazar et al. (2012) further noted that EHRs are recognized for enhancing the quality of healthcare by decreasing the frequency of medical errors, promoting better communication among healthcare providers, and establishing a foundation for comprehensive data analysis.

A study by Chaudhry et al. (2006) revealed that EHRs are expected to enhance the quality of healthcare, boost the efficiency of care delivery, and lower the expenses related to human services. Studies have highlighted the advantages of the time conserved in retrieving and comprehending information, along with the generation of monthly productivity reports. This efficiency leads to reduced waiting times for patients and shorter visit durations for healthcare providers. (Fraser & Blaya, 2010). According to Fraser and Blaya (2010), the implementation of various marking and standardized identification scanners significantly reduces the time required to locate documents. Additionally, a notable advantage of documented EHRs is the minimization of solution arrangement errors, coupled with an enhancement in adherence to healthcare standards (Fraser & Blaya, 2010). This relates to the decision support capabilities integrated within EHRs, which include alerts or suggestions for medication prescriptions, vaccine management, laboratory test requests, advisories regarding tranquilizer dosages, contraindications for medications, and various other risk-related issues.

2.2.1 Utilisation of Electronic Health Records Systems in Zambia

The implementation of SmartCare in Zambia marks a significant step forward in the management of healthcare records and the improvement of patient care services (MoH, 2022). This system has been integrated into various public health facilities, fostering better data accuracy, security, and interoperability among healthcare providers (SmartCare Zambia, 2024; Center for Infectious Disease Research in Zambia [CIDRZ], 2022). Currently, SmartCare has been implemented in close to 1,000 healthcare facilities, representing about one-third of the total health facilities in Zambia (Clarke et al., 2019). Within this context, the Lusaka district contains 13 district hospitals (Kruse et al., 2009).

There are many studies done on EHRs and SmartCare in Zambia. For example, Mweebo (2014) conducted a study that focused on the security of electronic health records in a resource-limited setting, specifically addressing the SmartCare electronic health record system in Zambia. He pointed out that it was still a significant challenge to maintain privacy and confidentiality in health information by restricting access only to those who are permitted to have access to patient data. Furthermore, Mweebo (2014) stated that the enhancement of security for the smart-care systems

in Zambia was achieved by introducing PINs for smart cards and staff access cards along with passwords. Additionally, the study revealed that some medical practitioners working in private institutions were hesitant to share the health information of their patients with other parties or healthcare facilities if they viewed them as rivals. This research focused specifically on the aspects of security and privacy of patient information. It did not highlight any experiences or perceptions health workers had with SmartCare for clinical decision-making but instead focused on implementing SmartCare.

Another study conducted by Ng'andu & Haabazoka (2024) aimed to identify potential implementation challenges and barriers while providing valuable insights for healthcare institutions looking to adopt or optimize their EHRs. The study results showed low health records digitalization and operational efficiency in the healthcare facility. The study hypothesized that digitizing medical health records would improve overall healthcare facility operational efficiency by improving access to patient information, streamlining workflows, reducing documentation errors, and improving communication among healthcare stakeholders. The study by Ng'andu & Haabazoka (2024) is similar to Mweebo (2014), whose research primarily focused on identifying the challenges associated with the use of EHRs and enhancing access to patient information. It did not address the role of registry personnel in the implementation of SmartCare EHR systems. Instead, the study concentrated on the operationalization and implementation difficulties faced by the SmartCare EHRs.

Although there have been initiatives to implement and utilize EHRs in many developing countries, a range of challenges have emerged, resulting in significantly lower adoption rates in comparison to developed nations. The primary obstacles include financial limitations, technological shortcomings, issues related to standardization, individual behavioral attitudes, and organizational constraints, which pertinently affect the adoption and utilization of eHealth and ICTs (Aiami & Chadegani, 2013).

Consequently, the literature examined in this section indicates that most of the studies have concentrated on aspects such as patient safety, the adoption of EHRs, and their functionality, rather than on the role of SmartCare in service delivery.

2.2.2 The SmartCare Electronic Health Record Management System

The SmartCare EHR system was developed in Zambia by the Ministry of Health with support from various partners. It is an initiated, nationally scalable EHR designed especially for low-resource, disconnected settings. SmartCare has the objective of improving the quality of health care and health by providing support to deliver "Continuity of Care" where existing paper systems are failing to preserve a longitudinal data view and where clinics may often have no telecommunications (MoH, 2008). According to Neame (2013), the primary goal of the SmartCare EHR program is to connect services for HIV clients and enhance the availability of health information, irrespective of their location. This is aimed at reducing delays in starting treatment, duplication of investigations, minimizing risks, errors, and expenses, and enhancing the standards, security, and confidentiality of HIV data in the country (Neame, 2013). SmartCare, originally developed to enhance the management of HIV care, has expanded its focus to encompass all aspects of healthcare service delivery, thus benefiting the broader population (MoH, 2023).

SmartCare EHRs are designed to be an 'e-first' system, implying that health staff input medical information using computers. Patients are given a SmartCare card (SmartCard) that has a chip that stores all their medical information, as well as a copy of the information from the medical institution (Van Reisen, 2017). SmartCare data is maintained at each facility through a distributed design, indicating that all gathered information is stored locally within each healthcare establishment. (Van Reisen, 2017). The system is designed to facilitate longitudinal record-keeping for various medical conditions, including the treatment of HIV/AIDS, tuberculosis (TB), self-directed counseling, and prenatal care, among others. Additionally, it offers clinical decision support, operates via touchscreen technology, enables offline data synchronization, and ensures data portability through the implementation of SmartCare Cards (Mutabazi, 2016).

Several studies have been done concerning the implementation of SmartCare EHRs. For example, Mutale (2017) conducted a study to determine health workers' experiences with the use of SmartCare for decision-making in selected health facilities in the Western Province of Zambia. This study found that health workers' perceptions and experiences with the SmartCare system were good. They pointed out that it was a good, easier, efficient, and more convenient way to store and retrieve patient files/records than paper records. However, the study lacks attention to service

delivery outcomes, and insufficient exploration of challenges limits its ability to comprehensively evaluate the system's role in improving healthcare delivery.

Furthermore, Mweebo (2014) studied the security of electronic health records in a resource-limited setting. The emphasis was on information security. The research identified significant security issues in Zambia's SmartCare EHRs, particularly regarding HIV patient data. Challenges included lost patient cards and unauthorized staff access. To improve security, measures such as Personal Identification Numbers (PINs) for patient cards and password-protected access cards for staff were implemented, restricting sensitive health information to authorized personnel. In addition, Gumede-Moyo et al. (2019) conducted a study based on the challenges associated with implementing SmartCare. One of the goals is to reduce the burden of paperwork on healthcare workers. The research findings highlighted various obstacles in the implementation of the SmartCare electronic health record system in Zambia, especially concerning the prevention of mother-to-child transmission (PMTCT) of HIV. Key challenges included deficiencies in system design, inconsistencies in data collection practices, insufficient financial resources, and a lack of effective feedback mechanisms. In this study, Kaumba (2023) studied factors affecting the implementation of the SmartCare EHR system in Zambia. The focus included general successes and challenges involved in the implementation. The research identified both successes and challenges in implementing the SmartCare system. Key achievements included the Ministry of Health's integration of SmartCare as the national electronic health record since 2017, supported by various stakeholders. However, challenges like inconsistent data collection, limited financial resources, and inadequate technical support hindered operational efficiency and sustainability.

2.2.3 Benefits of Using SmartCare

According to Bisrat et al. (2021), the SmartCare EHR has effectively enhanced the quality and efficiency of healthcare delivery while simultaneously lowering hospital expenses. This system offers numerous advantages, such as enabling quick access to patient records, thereby conserving physicians' time; promoting the sharing of patient HIV information through updated smart cards and integrated national databases; and supporting the monitoring and evaluation of HIV programs

through the establishment of national, provincial, and district databases. (CDC, 2010; Neame, 2013).

Furthermore, Halubanza, Kunda & Halubanza (2022) pointed out that patient information is electronically recorded and accessed through the SmartCare system, facilitating easy retrieval of patient records by authorized personnel and enhancing the efficiency of medical staff responses to patients. Upon visiting a healthcare facility utilizing the SmartCare system, patients are required to register for a healthcare card that encompasses all relevant patient information. (Halubanza, Kunda & Halubanza, 2022).

One additional benefit is that healthcare providers can track patients' health status in real time through the use of wearable technology. This allows physicians to address any medical requirements from a distance. This real-time health monitoring not only enhances the accuracy of diagnoses, potentially reducing the necessity for hospitalization, but it can also be life-saving during medical emergencies (Muhammad, 2021).

Another advantage of implementing SmartCare, according to Mweebo (2014), is that it has significantly streamlined the process of compiling patient lists scheduled for review. By utilizing a summary report generated from the database, healthcare professionals can efficiently access this information, in contrast to the previous paper-based system where nurses were required to manually compile lists from the cash register. Furthermore, SmartCare facilitates a comprehensive analysis of the entire patient cohort within a hospital, rather than relying on sampling methods that are often necessary with paper records, as it is typically impractical to review all case files within a limited timeframe. (Mweebo, 2014).

2.3 Use of SmartCare in the Management of Health Records

SmartCare is Zambia's national EHR system, designed to improve healthcare delivery by digitizing patient information and streamlining clinical workflows. According to Gumede-Moyo (2019), the main elements of Smart-Care include registration, outpatient services, inpatient management (covering patient admission, monitoring, and discharge in hospital wards), tuberculosis treatment, pediatric care, HIV/AIDS management (specifically for patients undergoing treatment at

antiretroviral therapy clinics), antenatal and postpartum services, pharmacy operations, drug inventory management, laboratory services (which entail the storage and transmission of lab results to the requesting clinics), and the electronic Health Management Information System (eHMIS) for generating monthly, quarterly, and annual reports, along with financial management. Registry personnel play a fundamental role in managing health records within this system, ensuring data accuracy, accessibility, and security. Mutabazi (2016) states that SmartCare is developed to support thorough longitudinal record-keeping for various health conditions, such as HIV/AIDS treatment, tuberculosis management, voluntary counselling and testing (VCT), and antenatal care. Furthermore, the system offers clinical decision support, incorporates touchscreen functionality, allows for offline data synchronization, and ensures data portability through smart card technology.

Halubanza, Kunda and Halubanza (2022) assert that patient details are captured and retrieved electronically from the SmartCare system, enabling authorized personnel to easily access patient records and expedite medical staff attendance to patients. In the same vein, Mengesha (2011) contends that SmartCare is used by clinicians, health facility managers, and data entry clerks. The input of patient information into SmartCare is carried out by either clinicians or data entry clerks, depending on their assigned role security, which dictates their access to certain modules. He further stated that data can be entered and/or accessed while the patient is in the health facility or after they have left.

Several studies have examined the utilization of SmartCare, Zambia's EHR system, by registry personnel in managing health records. For instance, Mutale (2017) examined how health workers used SmartCare in their decision-making processes. The findings indicated that health workers viewed SmartCare as a more efficient way to manage and access patient records than conventional paper-based systems. Similarly, Pande (2022) added that using laptops with the SmartCare EHR system to capture the information at facilities without electricity has helped reduce the backlog of patient information that has not been entered into the national database. Additionally, the use of SmartCare cards ensures that even patients from these rural and remote locations have their medical history available once transferred to higher levels of care where electricity is available.

A key feature of SmartCare is its contribution to improving data security and protecting patient confidentiality. In an era marked by numerous data breaches, SmartCare utilizes advanced security measures to protect sensitive information. According to Mweebo (2014), the software incorporates encryption methods and access controls, ensuring that only authorized individuals can access specific records. SmartCare has a considerable impact on registry personnel. Its user-friendly interface enables staff to efficiently enter and manage patient information, ensuring accurate record-keeping. The system allows for real-time updates, reducing the errors commonly associated with manual data entry. A study by Moomba et al. (2020) found that organizations using SmartCare experienced a significant reduction in data processing time, resulting in improved operational efficiency. This boost in efficiency allows registry personnel to focus on critical tasks, such as analyzing data for health outcomes, rather than being bogged down by administrative duties.

Registry personnel play a crucial role in the effective utilization of SmartCare, a digital health system designed to enhance patient management and healthcare delivery. One of their primary responsibilities is patient registration and record updates, where they create new patient profiles and update existing records with relevant demographic details, visit history, and contact information (HPCZ, 2016). This ensures that patient records remain accurate and up to date.

Another key function is appointment scheduling, as SmartCare enables registry personnel to manage patient bookings efficiently. By optimizing appointment scheduling, the system helps reduce patient wait times and improve service delivery within healthcare facilities (MOH, 2018). In addition to scheduling, data management is a critical component of SmartCare usage. Registry staff are responsible for entering, verifying, and maintaining medical records, which include clinical notes, test results, prescriptions, and treatment plans. Ensuring data accuracy is essential for informed clinical decision-making and effective patient care (HPCZ, 2016).

Moreover, reporting and monitoring are facilitated through SmartCare, as the system generates reports that aid in managing healthcare facilities, tracking patient attendance, and monitoring adherence to treatment protocols. These reports support evidence-based decision-making, allowing healthcare providers to assess patient trends and improve healthcare interventions (MOH, 2018). SmartCare also enhances interdepartmental coordination by enabling seamless communication between different healthcare departments. Through shared access to patient

records, healthcare teams can collaborate more effectively, ensuring continuity of care and reducing the duplication of services (HPCZ, 2016). Furthermore, confidentiality and security are paramount in handling patient data within SmartCare. Registry personnel are trained to manage patient information responsibly, ensuring compliance with health regulations and maintaining strict data privacy standards to protect patient confidentiality (MOH, 2018).

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2.4 Policy Framework and Standards for Electronic Health Record Management Systems

Keakopa et al. (2009) highlighted that establishing policies that govern the creation, storage, and retrieval of records is essential for effective electronic records management. These policies should be customized to the organization's specific needs, focusing on data retention, security, and access control, with input from stakeholders across departments. They further stipulated that policies should specify the criteria for electronic records, retention periods, disposal methods, and the roles and responsibilities of those managing them. At the same time, users must ensure accurate record creation and storage. It's also essential to effectively communicate policies to all employees. This can be done through regular training, email updates, and centralized policy access, which can enhance understanding and compliance, reducing the risk of data breaches and security incidents. Finally, the organization must regularly review and update its policies to stay relevant amid technological advancements and evolving regulations. By doing so, it can effectively manage its electronic records (Keakopa et al., 2009).

Owing to this, legislation for EHRs must be established (Khumalo, 2017). Furthermore, Okello-Obura (2011) argued that regulations have some influence on how governments, organisations, and individuals conduct their daily activities, and they affect how individuals create and use records, as records form the source of legal evidence. On the other hand, Ambira, Kemoni and Ngulube (2019) posit that in the quest to reduce major risks to sustained, stable, and quality information, a clear framework for electronic records management is key to the e-government platform. The health facility in Zambia has a policy for the creation, management, handling, confidentiality, storage, and destruction of all records following data protection legislation (HPCZ, 2011).

2.4.1 Records Management Policies

The records management policy is crucial for organizational effectiveness and ensuring that essential records are systematically managed from creation to disposal. Records management policy refers to an official written document that guides record management functions in an organisation (IRMT, 2009:5). A records management policy comprises a collection of principles and procedures that govern the management of an organization's records. The implementation of such a policy is essential for maintaining operational efficiency and adhering to legal and regulatory requirements. An effective records management policy is dynamic, adapting to the evolving needs of the organization as well as changes in external regulations (Keakopa et al., 2009).

In this regard, ISO 15489-1 (2001:5) states that organizations must document and describe their records management policies. The records management policy is meant to ensure that an organization's activities and decisions are recorded completely and accurately, managed and stored, and disposed of in compliance with applicable laws. This provides an organization with better access to information, as well as business enhancement and improvement. Furthermore, the organization will be accountable for its actions and ensure that its rights and interests, as well as those of its clients, staff and community, are protected. The policy framework for records management in an institution serves as the foundation for all functions and operations.

In this regard, the International Records Management Trust (1999d) states that records management policies establish a framework for implementing hospital records management programs and ensure that complete and accurate records of hospital activities are legally created, acquired, maintained, accessed, archived, and disposed of following legislative requirements. In the view of Mnjama and Wamukoya (2007), the level of an organization's commitment to keeping records can be measured by the availability or absence of records management policies, procedures and guidelines. They further noted that one of the main challenges in the region of the East and Southern African Regional Branch of the International Council in Archives (ESARBICA) was the lack of formal organizational policies and procedures for both paper and electronic records management.

Furthermore, the National Archives of Australia (2014) states that the policy aims to provide guidance and direction on the creation and management of information and records and to clarify employee responsibilities. Along the same line, Nengomasha (2009) states that policies should be approved and widely publicised to create awareness about their availability. The proper use of these policies prevents possible shortcomings in the management of medical records.
However, Marutha (2011), in his study, noted that hospitals in South Africa were at risk of officials working with their own devices due to a lack of policies particularly addressing patient record management. He further indicated that despite creating, receiving, and managing electronic records, most members of staff were not aware of the legal frameworks that guide the management of records in their departments. Therefore, records were not kept or managed following legal requirements, a situation which seriously compromised their management.

2.4.2 Electronic Health Record Standards

According to Huffman (1980), as cited in Adebayo (2019), a standard is a criterion against which performance can be compared. Standards are important in planning schedules and determining staffing needs. EHR standards are the building blocks for the exchange of health information. They provide a common reference framework to promote uniformity in the definition and identification of health system components. Standards enhance data quality, reduce medical errors, and reduce the need for customization of IT solutions across the healthcare system. According to Mogli (2001), as cited in Adebayo (2019), standards are generally a measure set by a competent authority as the rule for measuring quantity or quality. Conformity with standards is usually a condition of licensing, accreditation, or payment of service. Registry personnel must maintain medical records that are complete and readily accessible for prompt retrieval of information, including statistical data.

The successful implementation, testing, and adoption of EHRs require collaboration between healthcare professionals, patients, and policymakers. International standards can make this collaboration easier. One such standard, ISO 13606, was developed by a group of international experts to facilitate the secure and seamless exchange of health information between multiple EHR systems or between a system and a centralized data repository. These standards can promote interoperability, streamline data exchange, and uphold the confidentiality and integrity of patient

health information (AC06953431, 2008). Standards exist to ensure that products and services are of high quality, safe and reliable. (Keakopa et al., 2009). In line with this, the Global Digital Health Partnership (GDHP) (2021) highlighted that countries are at different stages of adopting and implementing health data standards. This variation necessitates harmonization to promote interoperability of EHRs and empower patients globally. The GDHP underscored the importance of awareness and cooperation among all stakeholders to achieve this harmonization.

A study conducted by Bwalya and Akakandelwa (2023) has shown that a lack of adoption of standards to support e-records management may result in public service creating and using an e-records system that does not meet international standards set by the International Standard Organisation, the United States of America Department of Defense, the National Records of Scotland, and the European Commission. Failure to establish standards for electronic records management can lead to a lack of compliance with international benchmarks, increased data security risks, legal and regulatory issues, difficulties in interoperability, a loss of institutional memory, and reduced operational efficiency. Together, these factors can significantly hinder the effectiveness of public service delivery (Newa & Mwantimwa, 2019). Furthermore, a white paper by Health Tech Ireland (2021) discussed that a lack of interoperability is a critical barrier to the adoption of digital health technologies. The paper stressed that addressing this barrier requires awareness and cooperation among all stakeholders, starting with a shared understanding of relevant standards in digital health.

In Zambia, the digital health sector is predominantly guided by the National Health Policy 2013, the Zambia National Health Strategic Plan 2017-2021, the Electronic Government Act, 2021, and the Smart Zambia Electronic Government Master Plan 2018-2030. These plans, policies, and legal frameworks collectively address several components essential to the daily operations of a digital health ecosystem, such as the responsibilities of maintaining records, ensuring patient confidentiality, and safeguarding access to health records. However, the legal and policy environment has not adequately guided data privacy and governance, medical confidentiality and cybersecurity, interoperability, data hosting, registration requirements for regulated activities, and liability for organisations, users, and consumers of health information systems data (MoH, 2023).

2.5 SmartCare and Service Delivery

The SmartCare Electronic Health Record (EHR) system is a key digital health innovation that significantly improves healthcare service delivery by enhancing data interoperability, supporting clinical decision-making, and streamlining patient information management. As a cornerstone of Zambia's digital health infrastructure, SmartCare enables integrated service provision across primary healthcare facilities and plays a vital role in tracking and monitoring national health indicators (MoH, 2023).

2.5.1 Easy Access and Storage of Information

The primary objective of SmartCare EHRs is to transform patients' medical records and health information collected in healthcare environments into a digital format. This transition to a computerized system allows healthcare facilities to access and retrieve patient records more efficiently. Numerous publications have documented the SmartCare system for service delivery in health institutions, including clinical decision-making, improved timeliness, enhanced documentation and data availability, and tracing of patients' routine visits (Mwinga, 2019; Nawa, 2018). The data kept in the EHRs can be combined to give the medical personnel a complete patient history that goes beyond the information collected in the provider's practice area (Shah, Murtaza and Opara, 2014). The study findings on health workers' experiences with the use of SmartCare for decision-making in selected health facilities in Mongu and Limulunga districts of Western Province show those health workers appreciated the SmartCare system compared to the traditional paper records. They stated that SmartCare helped organize and retrieve patients' records faster in comparison to the paper record system (Mutale, 2017). Likewise, Mweebo (2014) and Latha, Murthy and Sunitha (2012) posit that EHRs have many advantages over paper records, which improve accuracy, support patient health care, and improve quality. Mweebo (2014) further noted that by implementing SmartCare electronic records, health workers can easily get their hands on specific records. Similarly, a study by Mutale (2017) showed that the SmartCare system was easy and efficient to use and that it enhanced the storage and retrieval of patient records as compared to paper record systems.

2.5.2 Service Delivery Time

The effectiveness of service delivery in the healthcare sector is of utmost importance. The implementation of EHRs led to a 65% reduction in the time required to identify patients upon hospital admission, decreasing from 130 to 46 hours (Chaudhry et al., 2006). In Zambia, according to SmartCare Zambia (2024), the use of the SmartCare system has significantly improved service delivery: Patients no longer have to endure long waiting times to access medical care. The average waiting time or turnaround time for each patient is 30 minutes as they are reviewed as scheduled.

Darcy et al. (2010) carried out a case study in Zambia on an electronic patient referral application. The findings showed that EMR systems can improve patient care by allowing medical personnel to access patients' records throughout the geographic area; they can increase medical personnel's efficiency by reducing the time required for data management and record keeping. Similarly, a study conducted in Zambia by Mweebo (2014) focused on security issues related to the operationalization of SmartCare. The study's findings revealed that the use of SmartCare EHR has provided quicker access and retrieval to patient records, thereby saving physicians time. An exploratory study by Moomba (2017) on healthcare workers' perceptions and experiences on the use of the EMR and acceptability of EMR at Maramba and Mahatma Gandhi clinics in Livingstone indicated that SmartCare proved more efficient in providing patient care by reducing waiting times for patients.

2.5.3 Monitoring of Patients

Electronic Health Record (EHR) systems have emerged as vital elements in modern healthcare, offering tools that enhance patient monitoring and uplift the overall standard of healthcare. These systems enable the collection of data in real time, allow for remote monitoring, and provide support for clinical decision-making, ultimately resulting in improved patient outcomes. Electronic Health Record (EHR) systems allow healthcare providers to observe patients in real-time, which promotes prompt interventions. Rojas and Seckman (2014) note that EHRs can integrate with a range of monitoring devices that measure vital signs and notify clinicians of any irregularities.

A study by Kruse et al. (2018) demonstrated that hospitals that adopted electronic health record (EHR) systems experienced a 30% improvement in the efficiency of patient monitoring, which

was linked to the use of automated alerts and the availability of real-time data. In line with this, Paré, Jaana and Sicotte (2007) highlighted that EHR-integrated remote monitoring systems help manage chronic diseases such as diabetes and hypertension by tracking patients' conditions and reducing hospital visits. Similarly, a study by Machorro-Cano et al. (2023) demonstrated that integrating EHRs with wearable health technology improved patient engagement and adherence to treatment plans.

SmartCare, Zambia's national Electronic Health Record (EHR) system, has been instrumental in enhancing patient monitoring across various healthcare settings. In a study conducted by Mutale (2017), healthcare professionals reported positive experiences with SmartCare, emphasizing its benefits compared to conventional paper-based systems for accessing patient information. This feature significantly improves the capacity for timely and informed decision-making. Furthermore, the system's ability to generate pre-defined reports and dispatch automatic notifications has been particularly beneficial for tracking patient progress and efficiently managing care. Additionally, a study by Moomba (2017) on healthcare workers' perceptions and experiences on the use of the EMR and acceptability of EMR at Maramba and Mahatma Gandhi clinics in Livingstone indicated that SmartCare proved more efficient in providing patient care in many ways, including tracking patients.

Similarly, a study conducted by Mwanza (2019) indicated that SmartCare greatly enhances the tracking and follow-up of patients, leading to improved monitoring of CD4 counts, increased adherence to treatment, and more efficient management of missed appointments. This enhanced oversight is essential for the effective care of individuals with HIV/AIDS and is supported by SmartCare's strong data management features. Furthermore, Mweebo (2014) asserts that monitoring and evaluation of HIV programs is now easier due to the presence of national, provincial and district databases (Mweebo, 2014).

In the context of PMTCT, a qualitative study by Gumede-Moyo et al. (2019) investigated the challenges and successes in implementing SmartCare for PMTCT data collection, aiming to enhance clinic performance and program monitoring. The study highlighted the importance of addressing implementation challenges to fully leverage SmartCare's potential in monitoring and improving PMTCT outcomes.

2.5.4 Patient Referral System

Information systems can potentially increase communication between primary care and specialist medical practitioners by applying critical communications and computerizing referral work procedures. According to Liddy et al. (2015), electronic referrals refer to the automation of the referral process where appointments and other information related to consultation are exchanged between two or more healthcare professionals.

In this light, Nevhutalu (2014) submits that an e-referral message is created automatically with information directly from the patient records of the referrer and transmitted securely to the referee. According to Kim-Hwang et al. (2010), e-referral uses a web-based program incorporated in the electronic health record (EHR) to facilitate a structured review process for new referrals to specialty clinics. Further, Burton, Anderson and Kues (2004) aver that the objective of the referral is to ensure that adequate and timely information on the needs of patients concerning medical conditions and social situations is communicated to the next healthcare institution. It aims to have a continuous, coordinated delivery of quality health care by subsequent service providers. Additionally, Raeisee, Motlagh, & Kabir (2010) contend that a referral system has a vital role in reducing costs and improving patient access to expert services. Furthermore, Idowu (2004) posits that the process of using electronic health records to transfer a patient from one department or hospital to another is referred to as e-referral.

A study by Bashar et al. (2019) in India observed from their experiences that the e-referral system has a lot of advantages over the traditional paper-based referral system. They observed that technology helps health workers with the timely management of cases. Most importantly, the e-referral system aids in restructuring the current unorganized referral process. A study conducted by Straus et al. (2011) that examined the implementation of an electronic referral system (eReferral) that creates direct communication between primary care providers and specialist reviews were carried out at four (4) clinics (hospital-based clinic, a Community Oriented Primary 1338 Care (COPC) clinic, and two San Francisco Community Clinic Consortium (SFCCC) clinics) in America, where it was discovered that system acceptance was determined by views of improved access to specialty care, better appointment tracking, and enhanced communication between primary and specialty care providers.

A full economic assessment study of the e-referral system conducted in Denmark by Azamar-Alonso et al. (2019) had results divided into four groups: cost-effectiveness analysis, changes in workflow efficiency, the number of referrals, and the quality of referrals. It was found that an e-referral system was cost-effective compared to a paper-based referral system. Of the other eight studies that were carried out, three confirmed positive changes in referral processing, two evaluated changes in the quality of the referrals, and three evaluated if the e-referral system increased the number of referrals. Researchers further discussed that the proof based on the effectiveness of eReferral systems to increase communication between primary care and experts and to reduce wait times is positive but limited. However, the researcher suggested that economic appraisals were required to examine the clinical and economic value of eReferral systems in health care (Azamar-Alonso et al., 2019).

In every country, health care systems are structured in such a way that patients are encouraged to first seek health care at the primary health level and then go to an advanced level of care according to complex health needs (Bashar et al. 2019; WHO, 2010). Zambia, like numerous other nations, incorporates a health care structure that encourages a referral system with complex cases moving from primary to secondary to tertiary level (MOH, 2013).According to Clarke et al. (2019), SmartCare's electronic referral system was developed to enhance the efficiency of the referral process through the electronic submission and monitoring of referrals. This system facilitates coordinated care by enabling healthcare providers to exchange patient information securely and effectively. In Zambia, Clarke et al. (2019) posit that SmartCare has been instrumental in improving healthcare services, particularly in the areas of HIV treatment and antenatal care. The system's e-referral capabilities have enhanced care coordination, reducing delays in patient management and expanding access to specialized services. Studies show that SmartCare's e-referral system has led to a more efficient use of healthcare resources and improved patient outcomes (Clarke et al., 2019).

2.6 Challenges of Using the SmartCare Electronic Health Record System

Although advancements have been achieved with SmartCare, several challenges hinder its implementation in developing countries owing to poor infrastructure, lack of management commitment, standards, interoperability, support, experience, and poor EHRs (Bisrat et al., 2021; Silwamba, 2019). In addition, as noted by Kaumba (2023), SmartCare is presently encountering a range of difficulties. These include physical challenges associated with hardware, local area network (LAN) infrastructure, security protocols, and power supply; electronic challenges related to software bugs and service delivery; and operational challenges about issues of adoption and associated costs.

Studies conducted by Neame (2013) and Mweebo (2014) highlighted the difficulties associated with maintaining privacy and confidentiality in accessing health information using SmartCare EHRs in Zambia. Mweebo (2014) asserts that access to this system is limited to individuals authorized by the patient. However, the findings of the study indicated that SmartCare cards do not incorporate encryption security measures. Furthermore, the addition of PINs for SmartCare cards and staff access cards with passwords has improved the security of the SmartCare program in Zambia. Nevertheless, some scholars advocate for the inclusion of encryption as a key security feature to prevent hackers.

The other challenges include the expensive procurement and maintenance of the SmartCare EHRs, insufficient financial incentives and priorities, unreliable electricity supply and internet connectivity, and the limited computer skills of primary users (Silwamba, 2019).

2.6.1 Unreliable Electric Power Supply

The health sector is one sector that uses electricity for it to operate effectively and efficiently; therefore, there is a need for a reliable and resilient power supply. Any nation that finds it difficult to provide an uninterrupted power supply to its nationals will certainly have challenges with the good utilization of electronic systems such as EHRs (Achampong, 2012). Further, Lober et al. (2008) contend that a limited supply of electricity is one of the substantial reasons interrupting the implementation and use of EHR systems. An unreliable power supply can lead to delays in accessing patient records, misdiagnoses, or inappropriate treatments due to incomplete or outdated

information (WHO, 2016). A study on strengths, pitfalls, and lessons learned in implementing the electronic collection of childhood vaccination data in Zambia by Chibawe et al. (2019) showed there was low current use of the facility due to daily power outages that presented a practical challenge. Mweebo (2014) observed that time and again, there is a buildup of paper-based health records in rural health centers that are not entered into the smart-care database due to not having power. The buildup of paper-based health records is a cause for concern about the completeness of the national database used for investigation. Similarly, a study by Mutale (2017) explored the health workers' experiences and perceptions of the use of the SmartCare system in decision-making. Results revealed that SmartCare was not being used for decision-making in all the health facilities visited due to many factors, including a lack of reliable power supply.

2.6.2 System Failures

Another barrier that might affect the use of EHR is system failures. In Denmark, a study was carried out by Granlien, Hertzum, and Gudmundsen (2008) to assess the deployment of EMR in hospitals. The study revealed that factors for the adoption and use of the EMR comprise system factors, such as the EMR being perceived as prohibitively time-consuming to use, as well as human factors, such as lack of knowledge, information, and training among clinicians.

Similarly, in Saudi Arabia, Mahalli (2015) conducted a study that aimed to assess the adoption and barriers to the use of an EHR system by nurses at three governmental hospitals implementing the same EHR software and functionalities in the Eastern Province. The study revealed underutilisation of almost all functionalities among all hospitals and no utilization of any communication tools with patients. Furthermore, the study showed that the most frequently quoted challenges among all hospitals were loss of access to medical records transiently if the computer crashes or power fails, lack of continuous training and support from information technology staff in the hospital, additional time required for data entry, and system hanging up problems.

One of the challenges faced by SmartCare in Zambia is system downtime, which adversely affects healthcare operations (Mutale, 2017). Earlier studies by Mweebo (2014) and Mutale (2017) revealed that there have been numerous reports of technical issues, including server failures and

software errors, resulting in delays in accessing patient data and the potential loss of essential medical.

SanJoaquin et al. (2013) conducted a study in Malawi, implementing an electronic data collection system in a major hospital. The study's results revealed that there continued to be system failures for both hardware and software, posing a significant concern and undermining confidence in the system and highlighting the need for improved medical resources and digital health infrastructure.

2.6.3 Inadequate Staff Skills

While preparing for the introduction of EHRs, the availability of a qualified workforce is another issue to consider (World Health Organization, 2006). In addition, Silvestre (2018) states that the absence of well-skilled workers in health informatics is also an impediment, and in some settings, even elementary computer knowledge is limited. This, according to Nasser, Mohammed and Seham (2015), is seen in the difficulty of using EHRs, which is looked at as a barrier to implementing EHRs.

A study in Ethiopia by Alwan, Ayele and Tilahun (2015) assessed knowledge, computer utilization, and associated factors among health professionals in hospitals and health institutions. The results showed that computer knowledge and utilization habits were low among the health professionals who work in primary health centers. Another study conducted by Waithera, Muhia and Songole (2017) in Kenya revealed that the main problems identified were a shortage of funding for the adaptation and utilization of the EMR systems, computer illiteracy among staff, and a shortage of ICT staff in the facility. Additionally, Darcy et al. (2010) noted in their study that the successful implementation of EHR faces significant challenges, including a lack of human capital, low levels of physical and material resources, and low use once the system is implemented.

The implementation of Electronic Health Record (EHR) systems, such as Zambia's SmartCare, aims to enhance healthcare services by improving data management and patient care (Mpumila, 2024). However, the effectiveness of these systems is often hindered by a lack of adequate staff expertise. Numerous studies have highlighted key challenges related to staff skills in the effective utilization of SmartCare. A key issue is the lack of adequate training and support for personnel.

As noted by Mutale (2017) in a study conducted in the Mongu and Limulunga districts. They revealed that numerous healthcare facilities encountered several challenges, particularly the lack of basic computer skills among staff, which impeded their ability to effectively utilize the SmartCare system. This deficiency in skills leads to limited engagement with the system's functionalities and a persistent reliance on traditional paper-based methods. In a related context, Ng'andu and Haabazoka (2024) conducted a study that explored the effects of digitizing health records on the operational efficiency of healthcare institutions. Their research revealed several barriers and difficulties that impede the adoption and implementation of EHR systems in these facilities, which significantly affect operational efficiency. One of the primary challenges identified was the inadequate training provided to staff.

According to Mpumila (2024), a significant challenge in transitioning from paper-based records to digital systems is the initial learning curve. He also observed that employees often face anxiety and a lack of familiarity with technology, which can impede the effective implementation of SmartCare. Additionally, he emphasized the importance of comprehensive training programs that include classroom learning, hands-on experience, and ongoing support to address these issues (Mpumila, 2024). A lack of staff skills in using SmartCare may impact healthcare delivery in Zambia by compromising data accuracy, reducing efficiency, and limiting the system's potential to enhance patient care.

2.6.4 Inadequate Computers

The introduction of electronic devices such as computers in workplaces has helped to ease service delivery. However, due to inadequate computers, some institutions have not been able to perform effectively. In this light, Ravindra, Chandra and Dhenesh (2015) investigated the current status of electronic medical records and health information systems in Fijian hospitals and health centers. It also examined if the public as well as medical practitioners in Fiji had an interest in having web-based electronic medical records systems that allowed patients to access their medical reports and made online bookings for their appointments. The study revealed that due to the inadequacy of computers, staff members had difficulty entering data or checking patient records, thereby continuing to do so manually.

The successful deployment of EHR systems, as demonstrated by Zambia's SmartCare, is important for enhancing healthcare services through improved data management and patient care. However, the availability and adequacy of computing resources are critical factors that influence the effectiveness of these systems. Several studies have explored the challenges posed by inadequate computer resources in the implementation of SmartCare in Zambia.

A study by Clarke et al. (2019) revealed that many health facilities in Zambia face a shortage of computers, which prevents the consistent use of SmartCare. This lack of hardware forces healthcare workers to rely on paper-based records, reducing the benefits of EHRs. They further stated that a lack of adequate computer resources is the most significant effect; it is the challenge of data management. Insufficient access to computers leads to delays in data entry and processing, which can result in incomplete or inaccurate patient records. This problem compromises the quality of care and impairs decision-making by healthcare providers. Additionally, inadequate computer resources increase the workload of healthcare workers. In facilities where computers are scarce, staff may be forced to maintain both electronic and paper records, leading to duplicated efforts and an increased risk of errors. This inefficiency reduces the time available for patient care and negatively affects overall healthcare service delivery (Clarke et al., 2019).

Additionally, other studies have reported issues related to inadequate computer resources in the health facilities in Zambia. For instance, Mutale (2017) investigated health workers' experiences with the SmartCare electronic health record system in selected health facilities in Zambia's Mongu and Limulunga districts. The study revealed that inadequate computer resources were a significant barrier to the effective use of SmartCare. The lack of functional computers and unreliable power sources hindered data entry and retrieval, limiting the system's efficiency in decision-making processes.

2.6.5 Poor Internet Connectivity

Lack of access to the internet is another challenge in the implementation of EMR. The Internet aids in controlling costs and can transform the flow of information in the health sector. Healthcare institutions use the Internet for business processes because of its cost-effectiveness (Achampong 2012). In circumstances where there is good internet connectivity available, low speed as well as

high cost of bandwidth makes the system unreliable and more expensive (Bedeley & Palvia, 2014). Besides this, poor internet connectivity can critically affect the effectiveness of diagnosis and treatment routines. When implementing an EHR, network and hardware considerations are essential. According to Kaumba (2023), Local Area Networks are necessary for computers to link and transfer information among the numerous service locations (Triage, Pharmacy, Lab, etc.). For the EHR to be effective, the service points must be integrated such that information flows effortlessly from one service to the next to complete service delivery. For example, Stewart (2015), highlighted that high-speed Internet access is important because one of the provisions of the meaningful use requirement is that healthcare providers must be able to share a patient's EHR data with other providers and users.

Poor network connectivity presents considerable obstacles to the successful deployment and use of the SmartCare EHR system within healthcare facilities in Zambia. One of the primary challenges identified is the hindrance to real-time data entry and retrieval. In this light, Gumede-Moyo et al. (2019) pointed out that unreliable network connections resulted in delays in data synchronization, leading to inconsistencies in patient records and obstructing timely decision-making. Moreover, inadequate network infrastructure has been associated with reduced system efficiency. Thus, Mwiya (2022) also reported that 64% of users faced system-related issues, including poor connectivity, which negatively impacted the efficiency and sustainability of SmartCare. Additionally, insufficient network connectivity has led to the underutilization of the SmartCare system. According to Mwanza (2019), healthcare professionals struggled to access and update patient information due to network issues, prompting them to favor traditional paper-based methods over electronic systems.

2.6.6 Unavailability of SmartCare Cards

Smartcards are currently being considered as part of the implementation of e-health. They are fitted with a memory that can be both read and reprogrammed. Alliance (2012) defines a smart card as a small card or similar device with an embedded integrated circuit chip. According to Neame (1997), in a health setup, smartcards are thought to provide authentication of an individual's identity, enabling secure individualized data access and providing definitive audit trails for data

access. Mweebo (2014) further adds that as soon as the patient's data is entered into the smart-care database on a mobile device, it is immediately copied onto a smart card that is given to the patient. In this light, Van Reisen (2017) states that all patients entered into the SmartCare System shall be issued smart cards. In the healthcare industry, smart cards have reduced paperwork and protected patient records, improved the healthcare insurance process, provided clean data for eligibility verification and claims processing, and stored data describing health system activity. Additionally, using smart cards facilitates the enhancement of patient privacy and confidentiality (Alliance, 2007).

The SmartCare system, an EHR initiative introduced by the Zambian MoH, employs portable smart cards to enable the storage and transfer of patient information across healthcare facilities. This initiative seeks to enhance the continuity of care and improve data management (MoH, 2013). However, the unavailability of these smart cards presents significant challenges to the overall effectiveness of the system. In the absence of these cards, the seamless transfer of patient data between facilities is compromised, leading to fragmented care and an increased risk of data loss (MoH, 2013). This gap can result in inefficiencies in patient management and negatively impact the quality of healthcare services. Furthermore, limited financial and material resources may obstruct the production and distribution of smart cards, further affecting their availability in healthcare facilities.

2.7 Summary of Chapter Two

This chapter provided a comprehensive review of literature relevant to the study, focusing on the use of SmartCare in managing health records and its impact on healthcare delivery in Zambia. It explored key themes, including the definition and importance of records, electronic records, records management, the role of Electronic Health Record (EHR) systems, and the challenges associated with their implementation. The chapter also examined SmartCare's role in service delivery, its benefits, and the policy frameworks governing EHR systems. The chapter began by defining key concepts such as records, electronic records, and records management. Records serve as crucial evidence of activities and transactions, while electronic records processed using digital technologies offer improved accessibility, efficiency, and security over traditional paper-based

systems. Effective records management ensures proper creation, maintenance, and disposal of records, enhancing organizational efficiency, regulatory compliance, and accountability.

The review emphasized the significance of records across different sectors, particularly healthcare, where EHR systems improve patient care, clinical decision-making, and regulatory compliance. SmartCare, implemented in Zambia in 2008, was introduced to standardize health records, improve continuity of care, and enhance healthcare outcomes. Currently adopted in nearly 1,000 healthcare facilities, SmartCare has contributed to reduced paperwork, improved data security, and enhanced patient monitoring. Despite its benefits, SmartCare's implementation has faced significant challenges, including unreliable power supply, system failures, inadequate staff training, limited computer resources, poor internet connectivity, and the unavailability of SmartCare cards. Resistance to change among healthcare workers, along with insufficient technical support, has further hindered its adoption. However, the system has proven valuable in managing chronic diseases such as HIV/AIDS and tuberculosis and others, demonstrating its potential to improve healthcare delivery.

The chapter also examined the policy frameworks governing EHR systems, highlighting international standards such as ISO 13606, which promote interoperability, data security, and seamless health information exchange. In Zambia, policies such as the National Health Policy (2013), the Zambia National Health Strategic Plan (2017-2021), and the Smart Zambia Electronic Government Master Plan (2018-2030) provide guidelines for digital health implementation. However, gaps in data privacy, cybersecurity, and interoperability have limited SmartCare's full potential. Additionally, the study explored SmartCare's role in healthcare service delivery, noting its benefits in improving access to patient information, reducing service delivery time, enhancing patient monitoring, and strengthening referral systems. While SmartCare has improved efficiency in areas like HIV treatment and antenatal care, challenges such as system downtime, inadequate staff training, and resource constraints continue to affect its overall effectiveness.

In conclusion, the literature review underscores the transformative potential of SmartCare in enhancing healthcare delivery and records management in Zambia. However, for successful implementation, key challenges related to infrastructure, staff training, and policy frameworks

must be addressed. The findings from this review lay the groundwork for understanding SmartCare's role in healthcare delivery and emphasize the need for further research to evaluate its long-term impact on service delivery and patient outcomes in resource-limited settings. Lastly, the deduction from the reviewed literature is also brought out in this chapter. However, most of the studies reviewed have not considered the role of SmartCare in healthcare service delivery in first-level hospitals in Lusaka. This study contributes to the body of knowledge by filling the gap in the literature in the area of the role of registry personnel in the context of SmartCare in first-level hospitals in the Lusaka District.

CHAPTER THREE: RESEARCH METHODOLOGY

3. 0 Overview

This chapter discusses the research design adopted for the study, detailing the approach used to gather the necessary data to address the research questions. It covers key aspects such as the research philosophy, study population, sampling procedure, data collection methods, and research instruments. Additionally, the chapter describes the data analysis process and discusses issues related to the study's reliability and validity.

3.1 Philosophical Approach

This study adopted the constructivism paradigm, whose mother is the interpretive paradigm of philosophy. Turin, Chowdhury and Raihan (2024) noted that interpretivism and constructivism paradigms assume that reality is subjective and socially constructed by individuals based on their experiences and social interactions.

Constructivism is a theory of knowledge that argues that humans generate knowledge and meaning from interactions between their experiences and ideas.
Constructivists assume that individuals seek an understanding of the world in which they live and work (Creswell, 2008; Mogashoa, 2014). According to Žukauskas, Vveinhardt, and Andriukaitienė (2018), interpretivist research philosophy is based on the principle that states that the researcher performs a specific role in observing the social world. Adopting a constructivist approach was relevant to this study as it permitted the researcher to give meaning to the way things were and established factors that otherwise could not be easily uncovered.

3.2 Research Design

A research design provides a framework for the collection and analysis of data, which aims to show how all the main components of the research project work in collaboration to address the fundamental research questions (Kombo and Tromp, 2006). It includes a schedule of activities that guide the collection, analysis, and interpretation of data by a researcher. Furthermore, Kothari (2004) contends that a research design is a conceptual framework within which research is carried out; it is the basis for data collection, measurement, and analysis.

The study used a qualitative research design because qualitative methods are capable of generating insights that can explain the effects of individual peculiarities (Stoop and Berg, 2003). Furthermore, Kaplan and Maxwell (2005) affirm that qualitative research aims to understand matters or specific circumstances by examining the views and behavior of the people in these situations and the context in which they act.

Qualitative research design helped the researcher with an in-depth understanding of participants' (first-level hospitals' registry personnel) experiences and perspectives. Mwalimu (2010) contends that the qualitative method uses non-numeric data, such as words and other contextual factors that cannot be controlled. Additionally, Neuman (2014) asserts that the qualitative research approach relies primarily on non-numerical data such as spoken words, analysing written documents, observing activities, and reviewing visual images (namely, maps, pictures and videos). In this respect, the qualitative aspect of this study created insights into the role of the SmartCare Electronic Health Records System in the delivery of health services in first-level hospitals in Lusaka District, Zambia. Hence, it made it possible to draw conclusions based on the participants' responses.

3.3 Study Area and Population

This study was conducted at five (5) public first-level hospitals in Lusaka. Lusaka district was purposively selected because it is located in Lusaka, the provincial capital of the country, and was the first district to have rolled out and implemented the system in the first-level hospitals. The study was conducted at Chilenje, Kanyama, Chawama, Matero, and Chipata. According to available information from the facilities under study, Chilenje has twenty-three (23) registry clerks, Kanyama has forty-eight (48) registry clerks, Chawama has thirty-two (32) registry clerks, Matero has thirty-nine (39) registry clerks, and Chipata has forty-one (41) registry clerks, handling patients' records in both paper and electronic format and the 5 registry supervisors, one from each facility. When we add up the population for the five facilities, this gives a combined population of 183 registry personnel. Therefore, this formed the study population. This population was picked for this study because of their insight and understanding as they deal directly with records

management as part of their duties and also understand the strategic role of records in healthcare delivery.

3.4 Sample Size and Sampling Procedure

A purposive sampling technique was used in the present study. Purposive sampling is most stressed as the foundation for undertaking case study research (Creswell, 2014). This sampling technique was used based on the researcher's judgment on the ground that participants were knowledgeable on the topic under investigation and were able to provide the unique and rich information needed.

Thus, this study attracted 25 participants distributed as follows: 22 registry clerks. In addition, the researcher invited 3 registry supervisors (key informants), one from each hospital. Owing to the smaller number of registry supervisors, a complete census was conducted on this group of participants.

In terms of inclusion criteria, participants were included in the study based on being registry personnel and actively involved in the use of SmartCare for managing records. Active users, in this case, meant registry personnel who have been trained or oriented in SmartCare, enter data, view and print out reports, and make clinical decisions from those reports.

In terms of the exclusion criteria, health workers such as doctors, nurses, and clinical officers were excluded from this study. The inpatient registries were also not included in this study because they are not connected with SmartCare electronic records.

3.5 Data Collection and Data Collection Instruments

The study used individual in-depth interviews to collect data from the twenty-five (25) participants. The researcher found interviews to be appropriate for data collection. Mack et al. (2005) contend that interviews are very effective in giving a human face to research problems. Moreover, in-depth interviews expressively benefit the interviewer and interviewee as both experienced an appropriate interactive platform rarely provided by real-life occurrences. Using this method presented an opportunity to easily rephrase the questions. In addition, answers were

also derived from verbal recording in the observation method. To achieve maximum responsiveness, samples can be controlled effectually to lessen missing returns. Furthermore, to obtain close to accurate responses, questions can be appraised to suit the levels of education of the interviewee to avoid misinterpretation of questions (Kothari, 1990; Kumar, 2011). Interviews provide immediate answers (see Appendices 3 and 4 for the interview guides). To avoid missing out on some vital information, a digital audio recorder was used to record responses from the participants and was safely stored on memory chips.

3.6 Data Analysis

Qualitative data analysis involves organising and interrogating data in methods that allow researchers to see patterns, categories, and themes, develop justifications and make interpretations (Neuman, 2014). Researchers constantly make use of their intellectual abilities to make meaning of qualitative data. It constantly involves mind work (Mwiinga, 2013). Likewise, Dooly and Moore (2017:4) assert that the interpretation of qualitative data suggests that the researchers seek to make connections between events, perceptions, and actions through holistic and contextualized analysis.

In this regard, data was analysed thematically. The process involved transcribing audio files to transcripts, which was done by playing and replaying the audio while writing down the responses. The researcher became familiar with the data through repeated reading of the written transcripts/responses while writing down the themes that were emerging from the data. Data checks were conducted during and after fieldwork. Data were organised into main themes and sub-themes about the research objectives. The results have been presented in narration form and quotations.

3.7 Data Reliability and Validity

Reliability and validity are critical components of effective measurement and play a vital role in determining the credibility of any research project. As such, it is essential to ensure both reliability and validity, as they significantly affect the quality and trustworthiness of the data collected, ultimately influencing the overall integrity of the research findings (American Dental Hygienists' Association, n.d.), hence the need to ensure reliability and validity in this research.

To test the reliability and validity of the data collection instrument, the interview guide was pilot-tested on 9 participants who were representative of the larger sample.

3.7.1 Reliability

Reliability is a crucial requirement for validity, but it does not ensure validity on its own (Mohajan, 2017). According to Creswell & Creswell (2018), reliability refers to the consistency and repeatability of measurements, demonstrating how consistently a measurement tool yields stable and trustworthy results when applied multiple times under the same conditions. This notion is echoed by Churton (2017), who declares that for the research to be reliable, it should yield identical results if done under repeated research conditions. In this research, reliability ensured the interview guide yielded consistent responses when administered repeatedly, even by different researchers. An initial assessment was carried out to determine the effectiveness of the instrument before it was put into use. This helped the researcher to become acquainted with the research environment and to be able to implement methodologies in real-world settings before starting the main study. This preparatory phase was crucial in identifying potential challenges associated with research design and methodology, ensuring that the primary study is well-prepared and methodologically sound (McLeod, 2021).

3.7.2 Validity

According to Babbie (2020), validity pertains to the accuracy and relevance of measurements, assessing whether a research instrument or method genuinely measures what it purports to measure. Validity ensured the interview guide measured what it claimed to measure, taking into consideration the limitations that come with the instrument. To ensure validity, the researcher sought expert advice and assistance from the supervisors to improve the content validity of the instrument. This strategy was employed to ensure the instrument's accuracy and reliability. In addition, a comprehensive literature review was conducted both before and during the development of the data collection tool. Subsequently, the researcher provided typed scripts to the participants to confirm that the content reflected what was said during the interview. This exercise had the benefit of providing the researcher with initial feedback regarding the interview guide design, wording, and structure.

3.8 Ethical Considerations

Firstly, permission was sought from the Humanities and Social Sciences Research Ethics Committee (HSSREC) at the University of Zambia and first-level hospital Administrations. Additionally, permission was sought from the Provincial Health District Office (PHDO) in writing. Written informed consent was obtained from all key informants, including their consent to record the interviews and publish anonymous quotations. Participation in the study was entirely voluntary and participant anonymity was maintained throughout the processes of interview transcription, data analysis, and presentation by using pseudonyms. Permission to collect data from the health facilities was granted by the MoH district offices.

Permission was also sought from the National Health Research Authority through an online application where correspondence with the researcher was through e-mail and the system was updated to the changing status once all documentation was submitted or uploaded on the website of the National Health Research Authority (NHRA) to send an alert to the researcher (see Appendices 6 and 7). Verbal permission to go to the Registries and to speak to Registry personnel was sought and given by the hospital Superintendents in the designated hospitals.

3.9 Summary of Chapter Three

This chapter provided a detailed explanation of the research methodology employed in the study. It began by outlining the constructivist paradigm, which is rooted in the interpretive philosophy and assumes that reality is subjective and socially constructed. This paradigm enabled an in-depth exploration of participants' experiences and perspectives, making it particularly relevant for understanding the use of SmartCare by registry personnel in first-level hospitals.

A qualitative research design was adopted, as it is well-suited for exploring complex social phenomena and gaining insights into individuals' experiences and behaviors. The study focused on five public first-level hospitals in Lusaka, namely Chilenje, Kanyama, Chawama, Matero, and Chipata since Lusaka was the first district to implement SmartCare. The study population consisted of 183 registry personnel, from which 25 participants (22 registry clerks and 3 supervisors) were purposively sampled based on their knowledge and experience with the system.

Data collection was conducted through individual in-depth interviews, which allowed for the gathering of rich, detailed information. Interviews were recorded digitally to ensure accuracy. Thematic analysis was used to examine the data, involving transcription, repeated reading of transcripts, and identification of emerging themes that aligned with the study's objectives.

To ensure reliability and validity, the interview guide was pilot-tested on 9 participants. Reliability was addressed by assessing the consistency of the instrument, while validity was ensured through expert review, a comprehensive literature review, and participant verification of interview transcripts. Additionally, the chapter outlined ethical considerations, emphasizing the need for permission from relevant authorities such as the Humanities and Social Sciences Research Ethics Committee (HSSREC), the Provincial Health District Office (PHDO), and the National Health Research Authority (NHRA). Informed consent was obtained from all participants, and anonymity was maintained to protect their identities. Participants were assured that their participation was voluntary, with the right to withdraw at any time.

CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS

4 0 Overview

This chapter presented the findings of the study. The study's findings have been presented under subheadings relating to the study's objectives. Qualitative data obtained from interviews were analyzed thematically to bring out emerging themes. To present a comprehensive description of this chapter, the findings were organized according to the research objectives as highlighted in chapter one, namely:

i. ascertain registry personnel's experiences and perceptions of using the SmartCare system for managing healthcare (medical) records.
ii. determine the policy framework for managing records with the SmartCare health system.
iii. ascertain the extent to which SmartCare has enhanced service delivery.
iv. explore the challenges that registry personnel face with the SmartCare health

4.1 Response rate

Twenty-five participants were interviewed, and all gave consent, both verbally and in writing, to take part in the study. The study took place in five first-level hospitals in Lusaka, namely, Chawama, Chipata, Chilenje, Kanyama, and Matero. Table 1 summarizes the number of participants in the study.

Table 1: Participants from respective hospitals

Hospital	Registry Clerks	Registry Supervisors
Chawama level 1 hospital	5	0
Chipata level 1 hospital	5	0
Chilenje level 1 hospital	4	1
Kanyama level 1 hospital	3	1
Matero level 1 hospital	5	1
Totals	**22**	**3**

4.2 Socio-Demographic Characteristics of the Participants

The socio-demographic information of participants was collected to establish their backgrounds. The variables recorded were institution name, age, gender, length of service (experience), and level of education, as Table 2 shows. Of the twenty-five participants, twenty (20) were males while five (5) were females. The age range was 18–40 years, with the majority aged between 31 - 40 years, with a mean age of 33.7 years. In terms of length of service, the majority of the participants had worked for less than five years. Regarding their qualifications, the majority (15) had a diploma in different fields, while others had grade 12 certificates (three), college certificates (four), and bachelor's degrees (three). For those with a Bachelor's degree, one had a degree in Library and Information Studies (BALIS), the second had a degree in Development Studies (DS), and the third had a degree in Public Administration.

Table 2: Socio-demographic characteristics of participants

Variable	Values	Frequency (n=25)
Gender	Male	20
	Female	5
Age	18 – 20 years	1
	21 – 30 years	5
	31 – 40 years	13
	Above 40	6
Number of years in Service	0 – 5 years	15
	6 – 10 years	3
	Above 11 years	7
Education	Grade 12 Certificate	3
	College Certificate	4
	Diploma	15
	Degree	3

4.3. Registry Personnel Experiences and Perceptions on the Use of the SmartCare system for Managing Healthcare (Medical) Records.

The participants from five (5) first-level hospitals in Lusaka districts had different experiences and perceptions on the use of the SmartCare system for managing healthcare records. The research findings indicated that the participants valued the concept of the SmartCare system for record management and recognized its significance in ensuring continuity of care for patients. This study revealed a variety of experiences and perceptions that will be examined in greater detail in the following discussion.

To gain insight into the experiences and perceptions of registry personnel regarding the utilization of the SmartCare system for managing healthcare records. Registry personnel were asked to explain their experiences and perceptions on the utilization of the SmartCare system for managing healthcare records. The results indicated that all twenty-five (25) participants acknowledged the importance of SmartCare EHR systems in the registry, emphasizing its contribution to enhancing efficiency in record management through the following: a) SmartCare has made it easier to capture patients' demographic data, such as patients' names, date of birth, gender, residential address, marital status, and profession; b) SmartCare has made it easier to retrieve patients' data; and c) SmartCare has reduced the need for a lot of storage space as compared to the old manual system. In the interview with one of the participants working in the Main Outpatient Department (OPD), it was reported that SmartCare "*helps us to easily capture patients' information as compared to the old manual system.*" (RC01).

These findings are also supported by one registry clerk, RC19, who noted that:

> *"It helps us to capture information easily using SmartCare, allowing us to record data electronically. This system greatly simplifies the process of gathering information and entering data compared to the earlier manual registration method".*

Another participant stated that:

> *"SmartCare is important for efficiently collecting and managing information about clients who come to our facility. It guarantees the long-term storage of this data, which is especially useful for tracking patients with infectious diseases. The system enables the collection of vital information, including phone numbers and home addresses, supporting a thorough record-keeping process".*

"Furthermore, accessing information via SmartCare is simple, which improves overall efficiency" (RC18).

Furthermore, in an interview with a key informant, KI003 from hospital C indicated the following statement, as shown below:

"SmartCare has significantly changed our operational approach by replacing extensive paper records with electronic information. We maintain patient data within the system, allowing us to access records regardless of whether the patient has brought their documentation or card. For instance, in the case of an individual involved in an accident, it is important to know if they have any pre-existing conditions unrelated to the incident. In situations where such records are unavailable, SmartCare proves valuable, as it removes our dependence on missing information. The data stored in the system facilitates effective patient treatment and enhances decision-making, enabling us to determine the best course of action for each patient".

In addition to the above statement, another key informant, KI001 from hospital A, indicated that

"SmartCare has made things easier in that we don't have to file the books, and we do not have problems of running out of filing space".

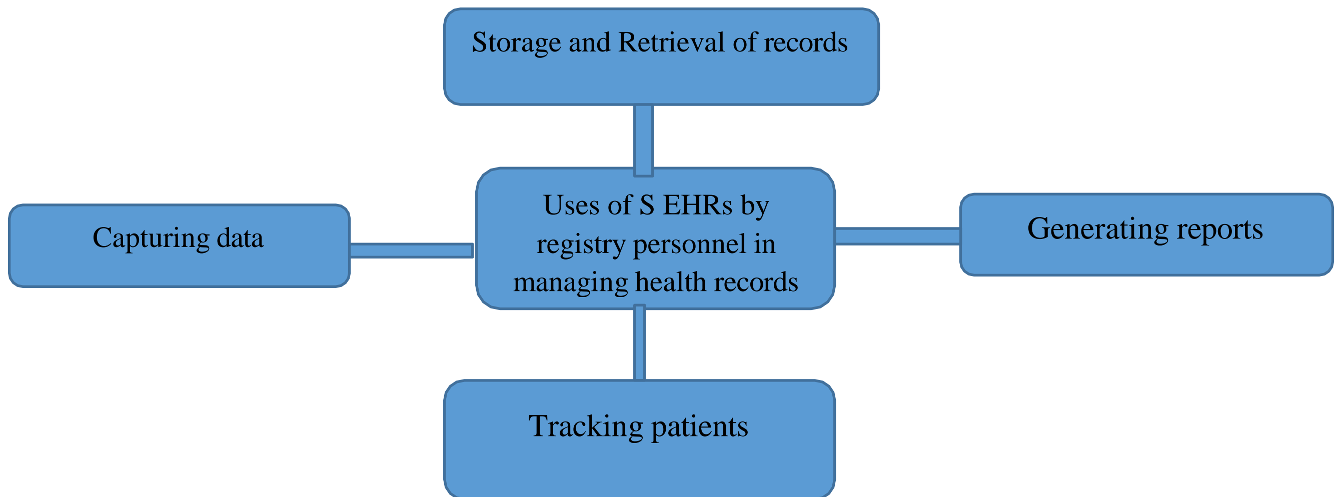

Figure 3: Uses of SmartCare EHRs by registry personnel in managing health records

4.4 Policy Framework and Standards for Managing Electronic Records in First-Level Hospitals

This section provides findings from the participants on the availability of a records management policy framework, standards, and guidelines for records management practices in first-level hospitals. To establish the availability of the policy framework for managing records in various first-level hospitals, twenty-five participants were asked whether they had a written records management policy for managing medical records in the various health facilities and who was responsible for preparing it. This was important because a records management policy is core to any records management function. It was established that nineteen out of twenty-five participants indicated that they did not have a written policy for managing patients' medical records. It was further established that the Ministry of Health was responsible for preparing a medical records management policy. A key informant (registry supervisor) at Hospital C stated that:

> "*As a hospital, we do not have a copy of the policy. If there is anything, we only receive instructions from the District Office or National Provincial Office" (KI003).*

This was also agreed to by another respondent, RC03, who said:

> *"There isn't one that I know of. We only receive instructions from our bosses and sometimes the District Office".*

However, some showed a positive response, quoting an excerpt from one of the interviews:

> *"Hmmm, yes, we have. I have not read through it. The document is too big" (RC19*).

Furthermore, participant RC06 added that..."*Yes, we do have a policy."*

However, when further asked whether there were any guidelines governing the creation and management of patient records, the majority of the participants acknowledged having guidelines. The participants further explained the required process when creating a patient's record as follows: Patient's name, date of birth, National Registration Card number (NRC), residential address, next of kin's number, and contact number of the patient for patients that are 16 years old and above. One of the participants explained that.

"When creating patients' records, we have a guideline that we follow so that at the end of the registration, we will be able to have the information that we need. For example, the name of the patient, age, residential address, NRC, and contact line so that we can be able to follow up with the patient in case of a condition that needs serious attention" (RC08).

Another participant, Key Informant KI002 at hospital B, stated that

"We have a set of guidelines that require that a patient's date of birth, mother's name, residential address, and place of birth be included. This practice helps in tracking patients, especially when many individuals have the same name. As a result, it becomes easier to differentiate between patients with identical names".

Participant RC15 also revealed that

"Some rules have been put in place; for example, when you are recording information from the client, the clients are not supposed to see what you are recording".

However, some showed a negative response, quoting an excerpt from one of the interviews:

"I don't think so. Not to my knowledge".

When further asked if they were aware of the local health records guidelines compiled by the Health Professions Council of Zambia (HPCZ), all (twenty-five) participants were not aware of these guidelines.

Participants were further asked whether they were aware of the internationally recognized records management standards, such as ISO 15489 and ISO 27001, that govern records management. Twenty of the twenty-five participants reported that they were aware of the international standards that govern records management and further reported that they were being applied by them. As stated by a key informant:

"Yes, I am aware, and we ensure that they are applied in our daily work" (KI003)

Furthermore, the other participant highlighted that

"Yes, I am familiar with them, as they were introduced to us at the beginning of our employment in the registry". (RC02)

Participant RC06 also said that *"Yes, I know them, and this is what guides me when doing my work."*

The two (2) participants who acknowledged being aware of these standards were asked to explain how they applied them. One participant indicated that they applied these standards by observing confidentiality and the privacy of patients' records. One participant (RC02) explained this as follows:

> *"It entails that we need to uphold the privacy of our patients. When people come in, they entrust us with their lives, so one of the standards is to uphold their privacy and give them the best service".*

Furthermore, participant RC06 added that

> *"We are required to follow the three (3) Cs, which are to have correct information, maintain consistency, and have completeness of the information that we are creating".*

Participants were asked whether health records were audited for compliance with records management standards. In an interview, it was revealed that audits were undertaken on electronic patient records created following the approved standards. In this regard, participant KI003 disclosed that:

> *"It is during the weekly review meetings that we check if the registry clerks are doing the right things when entering patients' data in the system".*

Another participant added:

> *"Our departmental meetings take place every Monday. It is there where we check the records made by each registry clerk to verify their accuracy and make sure they include all necessary information" (KI002).*

In supporting participants KI003 and KI003 options, participant RC07 also agreed that compliance audits are usually carried out by quoting:

> *"Our work is checked every week, and that is when we get questioned, especially if we make any mistakes or do not follow the instructions laid down".*

4.5 SmartCare Electronic Health Records System and Service Delivery

Participants were asked to explain how SmartCare had improved operations in healthcare delivery. Twenty-one (21) participants mentioned that SmartCare had improved operations in healthcare

delivery in many ways, such as improved service delivery (patients are attended to on time), improved storage of patients' records, and easy access and retrieval of patients' records. Others are tracking patients' medical records and improving the referral system.

When further asked how SmartCare has enhanced records storage and access, the majority of the participants stated that there is a significant improvement in patient's records storage and access.

Participant (RC19) mentioned that:

> *"It has improved operations because everything is done electronically; hence, all the information is readily available and can be accessed easily in the shortest possible time as compared to when we used to write on paper".*

Another participant stated that:

> *"It is less time-consuming with regards to registering patients as compared to the previous paper-based system, which used to take us several minutes to complete the registration process, to retrieve the patient's record, and also after several years, say two (2) or three (3) years, we would offload the books to give room for new entrants on the books on the shelves. However, SmartCare has made it easy for us to keep information electronically; we can quickly retrieve records, and clients do not spend too much time at the facility. We can keep track of every patient's information at any given time, regardless of the number of years that have passed" (RC 04).*

Additionally, participant RC06 remarked that:

> *"SmartCare has helped in reducing the cost of keeping records because we no longer have files that we keep in our registries. Our registries are now clean because all records are now in electronic form, and when clients come through, we can retrieve their records from the computer within a minute. I am glad to say that we no longer have the piles of files that we used to keep in the registry".*

Ultimately, participants indicated that SmartCare has tremendously improved service delivery. However, one participant was of the view that SmartCare had not improved operations in healthcare because there are times when SmartCare is not functioning and staff has to resort to the manual system. The participant expressed her views as follows:

> *"On this one, I wouldn't say yes or no because in SmartCare, some components are not complete and are not able to keep records—for example, if a patient has asthma, there is no continuity in SmartCare because you find that SmartCare is off today, and tomorrow you use paper. As a result, this has not helped in improving healthcare operations" (RC17).*

4.6 Challenges Faced in Using the SmartCare Electronic Health Records System for Managing Patients' Records

To establish the challenges participants faced when using SmartCare for managing patients' records, registry personnel were asked to indicate the challenges they encountered as they utilized the system. The study revealed various challenges, as illustrated in Figure 4 below:

One of the major challenges all the twenty-five participants faced when using SmartCare was a system failure. They indicated that in the event of system failure, staff were unable to register patients into the system or access patients' records in the system. Participant RC03 lamented that

> *"If the system goes down, it's a challenge because when patients come, we resort to writing their details in a book or on a piece of paper for them to be attended to, and they carry the same information with them home. The next time they revisit the hospital, those details that were written on paper are not entered into the system and will not be part of the information in the system".*

A key informant from the interview said:

> *"Sometimes, we have a challenge with the system hanging, and when this happens. We cannot use SmartCare, so we have to use books to register clients. This dependence on manual processes disrupts workflow efficiency and leads to increased wait times for clients". (KI002)*

Furthermore, the other participant highlighted that;

> *"There are times when the server goes down, so it affects the system. As a result, it causes congestion outside for clients because as registry clerks, sometimes we also don't want to go back to e-last (using paper) but wait for the server to start working. This also affects patients who have no patience as they return home without being attended to at the hospital" (RC12)*

Another participant (RC07) also lamented:

> *"The system sometimes encounters problems that cause it to become unresponsive. Currently, the system is very slow. This is one of the main factors contributing to our inconsistent utilization of it".*

The second greatest challenge, as observed by seventeen participants, was erratic power supply. The following are verbatim quotations from the responses of the participants to support the findings:

"There are times when the power goes out, and this becomes a problem because we stop using the computer and go back to registering clients either on a piece of paper or asking them to buy books if they have money. This delays the registration process and causes long queues". (RC09).

"Sometimes we experience load shedding, though it is no longer hours as it used to be. This time, it has improved, but any interruption in the power supply still affects our productivity. When the electricity goes out, we also lose access to electronic records, making it more challenging to keep track of a patient's medical history". (RC12)

"When power goes out, it takes time for the generator to switch on, especially at night when the people who are responsible are not there. It means we have to wait till they come. This means we have to stop using SmartCare and revert to books". (RC19)

The third challenge reported by sixteen participants was inadequate staff training in the SmartCare EHR system. This was confirmed by the remark below:

"Some of us did not go through formal training for SmartCare. Our learning process mainly occurs through on-the-job experience. As a result, we may have a basic understanding of the system, but there are particular tasks we are required to carry out. However, the absence of training might hinder our ability to perform these duties effectively" (RC12).

One registry personnel highlighted that

"They should put up much training on every person who is using SmartCare. Not everyone in the health facility knows how to use SmartCare. We just know how to enter the patient's details, and it ends there. But they have to train even beyond that". (RC17)

Participant RC13 also commented that

"I have not received formal training from individuals who know the system very well. The information I have has been acquired through interactions with my colleagues, resulting in a limited understanding of the SmartCare functions. My usage is limited to client registration and searching for client names".

The key informant attested to this fact by saying,

"Most of the staff here were not trained but were just oriented by other staff members. So, we need to have more staff trained so that they know the importance of SmartCare and how to use it effectively". (KI003)

The other challenges were the unavailability of smart cards, which impacted the effective use of the SEHS. The following excerpts are direct quotes from the participants' responses that support the mentioned findings:

> *"Right now, as we speak, we don't have smart cards. We have to use paper cards (these are small paper boards we have improvised for writing down patients' SmartCare numbers). Patients can keep a smart card, but if you give them a paper card, they just throw it away. To them, it's pointless to have a paper card". (RC17).*

> *"There is an inconsistency in the supply of SmartCare cards, which leads us to write the card numbers on paper. As a result, when clients visit another facility, they must start a new record because they do not have a card. Additionally, the systems are not connected, preventing them from accessing their information from our side". (RC20)*

> *"We often do not have smart cards available for our patients. As a result, we are unable to issue them smart cards, and all their information is stored in our system. This creates challenges when we need to refer patients to other facilities. We provide them with written card numbers, but many people fail to keep these numbers for long. Over time, the cards can get lost or torn". (RC09)*

> *"The big problem is that we often run out of official cards, so we create alternative paper cards that allow patients to keep a record of their Smartcard numbers. However, some patients do not prefer these paper cards. Some express their dissatisfaction by saying, "Nangaive vanene watipasa ndaba bazatu munabapasa makadi?" which translates to, "What is this you are giving us? Our friends received nicer cards" (RC16)*

Further, the study revealed that most health facilities have a limited number of computers to capture and manage health data. As a result of this, many registry personnel have resorted to using patient paper files rather than entering data on a computer. In an interview with participant RC10, the participant lamented inadequate computers, which he stated:

"We attend to many people, but we do not have enough computers. Because of this, we take turns working. There are times when only one computer is functioning".

One registry personnel, RC17, also highlighted that

"When SmartCare was introduced, we had enough computers. However, when computers are faulty and taken for repairs or maintenance, they are rarely returned. This has resulted in a shortage of computers".

Agreeing with the earlier statement, RC18 mentioned that:

"We typically attend to an average of 450 to 550 patients per day, but we only have two machines that operate 24/7. Sometimes, these computers freeze or hang, which causes disruptions. When this happens, we have to revert to writing information on paper. Unfortunately, when patients leave with this information, it can be lost, and we are unable to capture it accurately. This results in valuable data being lost for good".

The effectiveness of the SEHS was further hindered by inadequate network connectivity. During an interview, participant RC13 expressed concerns regarding the issues related to network connectivity: *"Sometimes, computers experience downtime due to network issues."*

Furthermore, the other participant highlighted that:

"At times, the network is very slow, making it extremely difficult to use the system effectively. During these situations, we often resort to using paper. However, whatever is written on that paper is not kept as part of the official records; the patient takes it with them, and this information is never updated in the system. As a result, there is always a gap in the patient's information" (RC09)

In another interview, participant RC17 mentioned that:

"Our network is inconsistent. Most of the time, it is down, and when there is no network, we cannot use the system. We have to revert to a manual process, which causes a lot of congestion in the lounge, as it is much slower. As a result, there is no continuity with SmartCare; one day, it is operational, and the next day, we are forced to use paper".

Another participant (RC20) also lamented:

"Sometimes, we lack a network, and at times, it fails us. What do we do then? There are moments when we use it and moments when we don't".

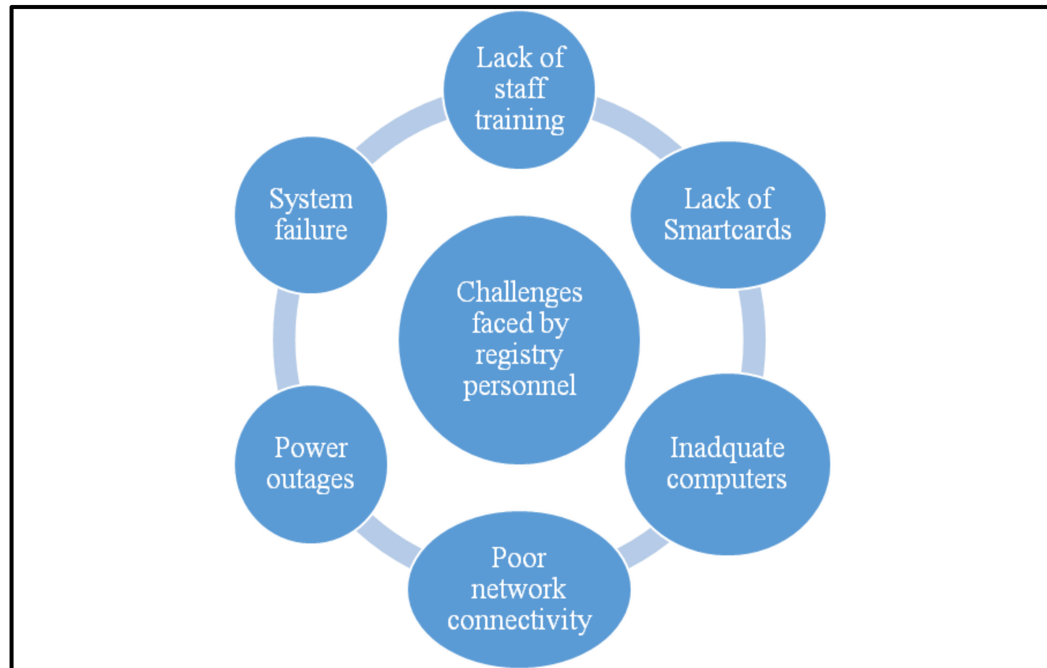

Figure 4: Challenges faced by registry personnel when using the SmartCare Electronic Health Record System

4.7 Summary of Chapter Five

This chapter presented the findings of the study, which were derived from in-depth interviews with 25 registry personnel, including clerks and supervisors from five first-level hospitals in Lusaka. The findings highlighted the significant role of SmartCare in improving efficiency in record management, particularly in capturing and retrieving patient data. Participants acknowledged that SmartCare reduced the need for physical storage space, enhanced data accuracy, and improved the accessibility of patient records. The system allowed for quick registration of patient demographics and easy retrieval of medical histories, which was not possible with manual record-keeping. However, concerns were raised about system downtime, which disrupted continuity in record-keeping when the system was offline.

The study also revealed a lack of awareness of formal records management policies among registry personnel. While some participants recognized basic guidelines for handling patient records, such as data privacy and capturing patient demographics, most indicated that these guidelines were not formalized or widely disseminated. There was also limited awareness of international records

management standards, such as ISO 15489 and ISO 27001, though some participants mentioned applying principles of confidentiality and data accuracy in their work. While compliance audits were conducted, they were often informal and limited to internal reviews during departmental meetings.

Participants reported that SmartCare had a positive impact on service delivery by streamlining patient registration, reducing waiting times, and improving the tracking of patient histories and referrals. The system facilitated faster storage and retrieval of patient records, enhancing operational efficiency. However, system failures and reliance on manual processes during downtime hindered the system's effectiveness. While SmartCare was seen as a valuable tool, its full potential was yet to be realized due to technical and infrastructural challenges.

The study identified several challenges faced by registry personnel in using SmartCare. These included frequent system failures, erratic power supply, inadequate staff training, unavailability of smart cards, limited access to computers, and poor network connectivity. System downtime forced staff to revert to manual record-keeping, disrupting workflow. Power outages caused delays in patient registration, while the lack of formal training meant that many staff relied on on-the-job learning, limiting their efficiency in using the system. The shortage of smart cards led to the use of paper-based alternatives, which were often lost, resulting in incomplete records. Additionally, insufficient computers created bottlenecks in data entry and retrieval, particularly in high-volume facilities. Unreliable internet connections further affected system performance, causing delays and data inconsistencies.

Thus, the findings highlighted both the benefits and challenges of SmartCare in managing health records at first-level hospitals in Lusaka. While the system has improved efficiency, accuracy, and service delivery, persistent technical and infrastructural challenges must be addressed to fully optimize its potential.

CHAPTER FIVE: DISCUSSION OF RESEARCH FINDINGS

5.1 Introduction

This chapter presents a discussion of the key findings of this study concerning the literature reviewed in this protocol. The discussion relates the objectives of the study to the findings of the research. The discussion is presented according to the themes derived from the objectives of the study. These include the experiences and perspectives of the registry personnel on using the SmartCare system for managing healthcare (medical) records, policy framework, guidelines, and standards for electronic health records management; the extent to which SmartCare has enhanced service delivery; and lastly, challenges of using the SmartCare system in service delivery.

5.2 Registry Personnel experiences and perceptions on the use of the SmartCare system for managing healthcare records

The first objective of the study sought to ascertain registry personnel's experiences and perceptions on using the SmartCare system for managing healthcare (medical) records in the first-level hospitals of Lusaka. The results as presented in sub-section 4.3 of chapter 4 indicated that registry personnel in first-level hospitals in Lusaka generally have positive experiences and perceptions regarding the use of the SmartCare Electronic Health Records (EHR) system for managing healthcare records. All twenty-five (25) participants acknowledged the system's ability to streamline record-keeping processes, improve data accessibility, and enhance overall efficiency in healthcare delivery. These findings are in harmony with the literature reviewed in Chapter 2, which highlights SmartCare's role in digitizing patient information, improving data accuracy, and supporting clinical workflows (Gumede-Moyo, 2019; Mutabazi, 2016). This fits well with the Records Continuum Model (RCM), which emphasizes that regardless of the media, records must be maintained within a continuum to guarantee their long-term accessibility, dependability, and utility (Upward, 1997). The study found that registry personnel perceive SmartCare as user-friendly, reducing the effort required to capture and retrieve patient information. This aligns with the effort expectancy construct, which suggests that ease of use influences the adoption of technology (Dwiyanto, Elmunsyah, & Yoto, 2020). SmartCare facilitates the systematic capture and organization of patient records, ensuring their long-term accessibility and reliability. With the

management of electronic health records through SmartCare, records are created at the hospital in the registries, organized, and stored in the system, and when a need arises or patients come, records are accessed or retrieved, used again, updated, and saved again.

A significant theme emerging from the findings is SmartCare's ability to enhance the efficiency of collecting and accessing patient demographic data. All the twenty-five participants noted that the system enables efficient collection of patient information, including names, dates of birth, residential addresses, and contact details. These findings concur with Halubanza, Kunda, and Halubanza (2022), who found that SmartCare allows authorized personnel to access patient records more easily, thereby improving efficiency in healthcare delivery. The electronic format of the system also eliminates the need for manual data entry, reducing errors and saving time. SmartCare ensures that records are constantly evolving as they are updated with new patient interactions, thereby maintaining their relevance and integrity. This revelation is in line with the Records Continuum Model (Upward, 1996), which emphasizes the ongoing and systematic management of records to ensure their accessibility and reliability throughout their lifecycle. By digitizing patient demographic information, SmartCare enables efficient records management, ensuring that data is continuously available and retrievable when needed. This finding also relates to the UTAUT2 model (Venkatesh et al., 2012), particularly the performance expectancy construct, which suggests that individuals are more likely to adopt a technology when they perceive it as beneficial in enhancing job performance. The participants' acknowledgment of SmartCare's efficiency in data capture and retrieval supports this theory, as it demonstrates how the system meets their expectations of improved work processes.

The study also found that SmartCare has significantly improved the accessibility and storage of patient records. The system allows for quick retrieval of patient information, even for individuals who have not brought their Smart cards or documentation. This feature is particularly useful in emergencies, where immediate access to medical histories can inform critical decisions. For example, a key informant (KI003) noted that SmartCare "removes our dependence on missing information," enabling healthcare providers to deliver timely and effective treatment. This finding agrees with Mutabazi's (2016) assertion that SmartCare supports longitudinal record-keeping, ensuring continuity of care across different healthcare encounters. From the perspective of RCM, this finding underscores the importance of maintaining a continuous and accessible recordkeeping

system that supports ongoing healthcare delivery. This demonstrates the pluralization dimension, where records serve multiple purposes and stakeholders beyond their initial creation (Upward, 1997). The longitudinal nature of recordkeeping facilitated by SmartCare aligns with the model's emphasis on maintaining the integrity and accessibility of records over time. Furthermore, UTAUT2's facilitating conditions construct (Venkatesh et al., 2012), which examines the availability of technical and organizational support, is relevant in this context. The system's ability to store and retrieve patient records efficiently is contingent on factors such as stable infrastructure, adequate training, and technical support, all of which influence user adoption and satisfaction.

Additionally, the study found that participants appreciated that SmartCare has reduced the need for physical storage space, as electronic records eliminate reliance on bulky paper files. This finding aligns with Moomba et al. (2020), who found that organizations using SmartCare experienced improved operational efficiency due to reduced paperwork. From an RCM perspective (Upward, 1996), this transition to electronic records enhances the management of records across their continuum, ensuring that records remain useful and accessible while reducing logistical burdens. These findings were in tandem with the UTAUT2 theory. The UTAUT2 model (Venkatesh et al., 2012) also helps explain this finding through the effort expectancy construct, which posits that technologies perceived as easy to use and less burdensome encourage greater adoption. By reducing the workload associated with paper-based records, SmartCare aligns with users' expectations of convenience and efficiency, thus increasing its acceptance among registry personnel.

The study further revealed that SmartCare has improved the overall efficiency of healthcare delivery by reducing waiting times and streamlining administrative processes. The majority of the participants reported that the system allows for faster patient registration and retrieval of medical histories, enabling healthcare providers to attend to patients more promptly. These findings are like those of Pande (2022), which showed that SmartCare has helped reduce backlogs in data entry, particularly in facilities with limited resources. The similarities between these findings may be attributed to the universal challenges faced by healthcare facilities, such as administrative inefficiencies and delays in accessing patient records. Since SmartCare is designed to address these challenges, its implementation consistently results in improved efficiency across different healthcare settings. Moreover, the alignment of these findings suggests that technological

interventions like SmartCare have a predictable impact on streamlining workflows, reinforcing the effectiveness of digital health solutions. From the perspective of UTAUT2 (Venkatesh et al., 2012), the social influence construct is appropriate here, as registry personnel's adoption of SmartCare is influenced by their perception of its acceptance and endorsement by colleagues and supervisors. As more personnel recognize its benefits in reducing administrative delays, the likelihood of continued adoption and integration increases.

The successful implementation of SmartCare in health registries relies on the support of registry personnel and facility authorities, who provide the necessary technical infrastructure, security measures, and data management tools for its efficient operation. While registry personnel are best equipped to utilize the system, fostering a strong collaboration with facility authorities is crucial to addressing both its technical and organizational requirements. Effective coordination and communication between healthcare facilities and records management professionals are essential for the successful adoption and long-term sustainability of SmartCare in Zambia's public health registries.

The findings from this study objective reveal that registry personnel in Lusaka's first-level hospitals generally have positive experiences and perceptions regarding the use of the SmartCare system for managing healthcare records. Participants consistently highlighted the system's ability to streamline data management, improve the accessibility and reliability of patient records, and enhance overall efficiency in healthcare service delivery. SmartCare's user-friendly interface, its role in reducing manual paperwork, and its support for the systematic and continuous management of records all contribute to its effectiveness as an Electronic Health Records (EHR) system.

These findings align with the theoretical frameworks applied in the study namely, the Records Continuum Model (RCM) and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). SmartCare's ability to support longitudinal record-keeping and serve multiple stakeholders reinforces the RCM's emphasis on continuous, accessible, and multi-dimensional records management. Similarly, the registry personnel's positive perceptions of the system's usefulness, ease of use, and efficiency reflect key constructs of the UTAUT2 model, such as performance expectancy, effort expectancy, facilitating conditions, and social influence.

Overall, the study underscores the importance of continued technical and organizational support in ensuring the successful and sustainable use of SmartCare. It also highlights the critical role of registry personnel in maintaining accurate and accessible healthcare records, which are essential for improving patient care and operational efficiency in Zambia's public health sector. Strengthening collaboration between registry personnel and facility authorities will be key to optimizing the impact of SmartCare and similar digital health interventions in the future.

5.3 Policy Framework, Standards, and Guidelines for Electronic Health Records Management Systems

The major objective of the records management policy, according to the National Archives of Australia (2014), is to provide guidance and direction on the creation and management of information and records and to clarify employee responsibilities. In healthcare service delivery, policies, standards, and guidelines are critical in the management of electronic health records because they provide fundamental accountability and protect human rights (HPCZ, 2018).

The findings of the study revealed that the majority nineteen (19) out of twenty-five (25) participants were not aware of any existing policy framework(s) that guide the management of EHR systems in Zambia. However, even though the findings show that there is a lack of awareness of the existing policy frameworks governing EHRs among many participants, literature has reviewed that, in MoH (2023) in Zambia, the digital health sector is predominantly guided by the National Health Policy 2013, the Zambia National Health Strategic Plan 2017-2021, the Electronic Government Act, 2021, and the Smart Zambia Electronic Government Master Plan 2018-2030. These plans, policies, and legal frameworks collectively address several components essential to the daily operations of a digital health ecosystem, such as the responsibilities of maintaining records, ensuring patient confidentiality, and safeguarding access to health records. The Electronic Government Act of 2021 in sections 13 and 14 also permits public bodies to keep e-records and describes how they should be kept (The Republic of Zambia. Parliament, 2021). However, it is crucial to know that the impact of these regulations on organisational records management practices depends on their clarity, understanding, and enforcement.

A major concern was the limited understanding among registry personnel in Zambian healthcare facilities regarding the policies governing the management of the SmartCare Electronic Health Records system (EHRs). Thus, the fact that the registry personnel responsible for using SmartCare EHRs in the healthcare facilities in Zambia did not have a full grasp of the policy governing the management of Electronic Health Records (EHRs) was a cause for concern. The limited understanding of the policy frameworks among stakeholders highlighted a clear gap in the interpretation and dissemination of existing legal provisions. These provisions were designed to ensure that healthcare facilities in Zambia properly value and manage their electronic records, yet they had not been effectively communicated to all personnel involved in records management.

As captured in the UTAUT2 theory in Chapter 1, the Facilitating Conditions (FC) believe that organisational resources, technical infrastructure, and support systems are available to enable the use of technology (Venkatesh et al., 2003). Ajzen and Fishbein (2020) also added that this construct encompasses various factors that can directly influence actual behaviour, such as the training or knowledge individuals acquire.

The findings regarding the lack of awareness of legal provisions align with research conducted by Marutha (2011) on records management in support of service delivery within the public health sector of South Africa's Limpopo province. The study revealed that, despite creating, receiving, and managing electronic records, most staff members were unaware of the legal frameworks governing records management in their departments. As a result, records were not maintained or managed in compliance with legal requirements, significantly compromising their proper management. Concerning the standards for EHRs, the study findings revealed in sub-section 4.3 that the majority of the participants were not aware of the internationally recognised standards for EHR systems. Moreover, all the facilities studied in the Lusaka district have not adopted any recognised international standard(s) but have set up internal standards that they use to benchmark against the management of their EHRs. This indicates that healthcare facilities in the Lusaka district do not manage their EHR records under widely accepted international standards. Consequently, Electronic Health Records (EHRs) may not be systematically created, captured, utilised, or managed, potentially compromising their quality. This challenge often arises from healthcare facilities' failure to adhere to established EHR management standards, which may be due to a lack of awareness or understanding of these guidelines.

Furthermore, the findings of this study in sub-section 4.3 of chapter 4 showed that despite the availability of these pieces of legislation, first-level hospitals in Lusaka were operating without a records management policy, standards, and guidelines because registry personnel revealed that they were not aware of the existence of these statutory instruments, such as the General Public Service Records Management Policy, the National Archives Act Cap 175, and the PHCZ guidelines. This implies that registry personnel are not able to adhere to good records management practices owing to the fact they were ignorant of the existing laws governing EHR management. These findings confirm an earlier study by Bwalya and Akakandelwa (2023), who revealed that several key informants were not aware of the existence of laws to support e-records management in Zambia. This may result in public service creating and using an e-records system that does not meet international standards set by the International Standard Organisation, the United States of America Department of Defense, the National Records of Scotland, and the European Commission (Newa & Mwantimwa, 2019). This challenge may not be unique to Zambia; for example, in Ireland, a white paper by Health Tech Ireland (2021) indicated that lack of interoperability is a critical barrier to the adoption of digital health technologies. The paper stressed that addressing this barrier requires awareness and cooperation among all stakeholders, starting with a shared understanding of relevant standards in digital health.

This study has therefore exposed a need on the part of the government and other stakeholders to vigorously sensitise registry personnel on the existence and importance of policies, standards, and guidelines regarding EHR management. This view is supported by Nengomasha (2009), who stated that once policies are approved, they should be widely publicised to create awareness among all concerned to prevent possible shortcomings in the management of medical records. Consequently, there is a need for the MoH to raise awareness among records officers about the existence of laws that support e-records management. This is necessary so that the problem of inconsistency and poor-quality records management practices can be avoided. Thus, for an effective EHR program to be achieved, healthcare institutions must adopt or develop relevant standards to govern their electronic health records (EHRs). Standards serve as critical tools for managing EHRs, as they provide a structured framework and clear guidelines for the consistent and efficient management of records within an organisation.

This study objective reveals a critical policy awareness and adherence gap among registry personnel managing SmartCare EHRs in Lusaka's first-level hospitals. Despite existing legal frameworks, such as the Electronic Government Act (2021) and national health policies, most participants were unaware of governing standards, leading to inconsistent EHR management practices. The lack of formal adoption of international standards compromises record quality and interoperability. These findings underscore the urgent need for targeted sensitization programs and institutional capacity building to ensure compliance with established policies, enhance EHR reliability, and align Zambia's digital health ecosystem with global best practices. Sustained stakeholder collaboration and policy enforcement are essential to realizing the full potential of SmartCare in improving healthcare records management.

5.4 SmartCare Electronic Health Records System and Enhanced Service Delivery

In terms of the extent to which SmartCare has enhanced service delivery, EHRs are expected to improve the quality of care, the effectiveness of the care process, and the affordability of human services (Chaudhry et al., 2006). The study findings on how the SmartCare Electronic Health Record (EHR) System has enhanced service delivery was indicated by twenty-one (21) participants who revealed that the SmartCare EHR system has streamlined healthcare services and improved service delivery compared to the paper-based system, enabling patients to be attended to promptly and efficiently. The study further found that clinicians can now log in, manage patient information, track medications, and easily access medical records. This has reduced the time spent on administrative tasks, allowing them to focus on what matters most – providing quality healthcare to patients.

These findings have reinforced what is already known from earlier researchers like Musukwa (2011), whose study on user perception of the effectiveness, efficiency, satisfaction, challenges, and training of electronic data systems in Malawi showed that users preferred the EMR over paper-based records. Similarly, Mwinga (2018), Nawa (2018), and Moomba (2017) have all stated that the use of EHRs has enhanced overall service delivery in hospitals. The use of SmartCare has been embraced by the registry personnel interviewed in the first-level hospitals due to its efficiency and effectiveness in service delivery. Because of this, there is a need for the Ministry of Health to roll out this innovation to other hospitals in the country. The findings of the current study align with

UTAUT2 as it enhances better healthcare outcomes, ease of use, recommendations from doctors and peers, and provides availability of technology and support—all of which drive user adoption and engagement.

The study demonstrates that the SmartCare EHR system has significantly enhanced healthcare service delivery in Lusaka's first-level hospitals by streamlining patient management, reducing administrative burdens, and improving clinical efficiency. These findings align with existing literature on EHR benefits and UTAUT2's technology adoption framework, confirming the system's positive impact on care quality and operational effectiveness. The results underscore the need for nationwide SmartCare implementation, supported by continuous training and technical infrastructure, to maximize its potential across Zambia's healthcare system.

5.5 Challenges Faced by Registry Personnel in the Use of SmartCare Electronic Health Records System

The study's findings have identified several challenges that hinder the effective implementation of SmartCare EHR systems in healthcare facilities. As indicated in Chapter 4, system failure emerged as a significant issue affecting the use of SmartCare EHR systems. Evidence from the health facilities aligns with earlier studies conducted in Zambia, which noted issues surrounding system failures in the implementation of SmartCare EHRs. For instance, Mweebo (2014) and Mutale (2017) reported numerous instances of technical difficulties, such as server failures and software errors, which caused delays in accessing patient data and the risk of losing essential medical information.

One prominent challenge faced by SmartCare in Zambia is system downtime, detrimental to healthcare operations. Mweebo (2014) and Mutale (2017) highlighted technical problems, such as server failures and software errors, resulting in delays in accessing patient information and the potential loss of vital medical records. The findings indicate that system failures, particularly in the context of SmartCare within the health sector, can lead to significant repercussions, including disrupted healthcare services, loss of critical patient data, delayed treatments, and a decrease in trust in digital health systems. These failures jeopardize patient safety and contribute to inefficiencies and heightened operational costs. The impact reaches beyond individual healthcare facilities, influencing the overall health system’s ability to deliver timely and effective care.

To address these challenges, several strategies should be implemented. Regular system maintenance and updates are crucial to ensure optimal functionality and security, preventing technical failures that could impede healthcare service delivery. Moreover, comprehensive staff training is essential, as healthcare professionals and registry personnel need to possess the necessary skills to navigate and troubleshoot electronic health record (EHR) systems effectively. The establishment of robust backup systems is equally important to protect patient data and maintain continuity of care during system failures. Additionally, promoting collaboration among stakeholders, including healthcare providers, IT specialists, policymakers, and software developers, can contribute to building a more resilient and adaptable digital health ecosystem. The Facilitating Conditions construct of the UTAUT2 is especially pertinent in this context. This construct emphasizes the importance of both organizational and technical infrastructure in supporting system use and ensuring successful technology adoption. Adequate infrastructure, including reliable hardware, software, and network connectivity, is vital for the seamless operation of digital health systems. Furthermore, strong institutional support, such as clear policies, user-friendly interfaces, and ongoing technical assistance, can improve system usability and encourage healthcare professionals to incorporate technology into their daily practices (Venkatesh et al., 2003). By addressing these critical factors, healthcare systems can improve the reliability and efficiency of digital health technologies, ultimately enhancing patient outcomes and reinforcing trust in EHR systems.

The study's findings further revealed that a lack of qualified personnel and inadequate training presents significant challenges to the adoption and implementation of Electronic Health Records (EHRs) in Zambian healthcare facilities. The effective deployment of EHR systems in Zambia's health sector depends largely on the competence of medical records personnel. These individuals must possess or acquire the necessary knowledge and skills to efficiently manage both paper-based and electronic records. A lack of proper EHR training among registry staff can directly impede healthcare facilities from achieving their intended goals.

As organizations conduct business activities and transactions, they generate vast amounts of records that must be properly maintained and preserved as evidence of operations. However, if the staff responsible for managing these records lack the necessary qualifications, the risk of data loss

or damage increases. This leads to inefficiencies, wasted time, and a negative impact on service delivery to the public. These findings have reinforced what is already known from the results of earlier researchers like Mutale (2017), who posits that the lack of basic computer skills among staff impedes their ability to effectively utilize the SmartCare system. This deficiency in skills leads to limited engagement with the system's functionalities and a persistent reliance on traditional paper-based methods.

The research findings also align with the study by Ng'andu and Haabazoka (2024), who pointed out that several barriers and difficulties impede the adoption and implementation of EHR systems in these facilities, significantly affecting operational efficiency. They further noted that one of the primary challenges was the inadequate training provided to staff. As indicated in the UTAUT2 framework, the facilitating condition construct encompasses various factors that can directly influence actual behavior, such as the training or knowledge individuals acquire to enable the use of technology (Ajzen and Fishbein, 2020). When an organization employs skilled staff, new technologies can be integrated and adopted more effectively. Therefore, when interpreted through the lens of the UTAUT2 framework, the findings of this study suggest that the successful deployment of EHR systems in Zambia's health sector will remain unattainable unless those responsible for managing records acquire and continuously update their knowledge and ICT skills. These competencies are essential for them to perform their duties effectively in this digital era.

The study findings also revealed that a lack of adequate computers was another impediment to the implementation of SmartCare EHR systems in the healthcare facilities of the Lusaka district. A shortage of computers in a healthcare facility registry can cause inefficiencies, including delays in accessing patient records, longer wait times, and a heavier workload for staff. This may lead to errors, reduced quality of patient care, and frustration among both healthcare providers and patients. Additionally, it can hinder data accuracy, real-time updates, and overall operational effectiveness, ultimately compromising the quality of healthcare services. As demonstrated by the findings in Chapter 4, healthcare facilities in the Lusaka district lack sufficient computers, which restricts their ability to utilize the EHR system effectively. This disagrees with the UTAUT2 which provides a useful framework for understanding the adoption challenges of SmartCare in Zambia (Venkatesh et al. (2012). Applying this model to SmartCare, performance expectancy suggests

that registry personnel are more likely to adopt the system if they believe it improves their efficiency and accuracy in patient record management. However, without sufficient computers, the perceived usefulness of the system is diminished.

The findings of this current study are consistent with those of Mutale (2017), who highlighted the lack of adequate computer resources as a significant obstacle to the effective use of SmartCare, thereby limiting the system's ability to enhance decision-making processes. There is a need for increased investment in computer infrastructure to ensure that healthcare facilities have sufficient and well-functioning computers. Government support, donor funding, and public-private partnerships can help bridge the resource gap. Furthermore, regular maintenance and technical support should be provided to ensure that available computers are fully operational and that healthcare workers receive timely assistance when technical issues arise.

The study findings also showed that the inconsistent supply of SmartCare cards was another challenge that hindered the use of EHRs in health facilities. The inconsistent supply of SmartCare cards disrupts patient care by causing delays in accessing medical histories, leading to longer consultations and repeated information requests. It also results in poor data management, forcing facilities to rely on manual record-keeping, which increases errors and inefficiencies. The administrative burden on healthcare workers rises as they spend extra time retrieving patient information, thus reducing overall efficiency. Additionally, data security and privacy are compromised when sensitive patient information is stored in physical documents. Lastly, the inconsistency undermines trust in digital health systems, discouraging both patients and healthcare providers from fully adopting electronic records. This finding concurs with the literature from the Ministry of Health (MoH, 2013), which highlighted that in the absence of these cards, the seamless transfer of patient data between facilities is compromised, leading to fragmented care and an increased risk of data loss. The findings of the current study do not resonate with the UTAUT2 and the RCM. The inconsistent supply of SmartCare cards hinders adoption by reducing performance expectancy, increasing effort expectancy, weakening social influence, and limiting facilitating conditions (UTAUT2), while also preventing healthcare facilities from progressing through adoption stages, which leads to partial or inefficient implementation (Continuum Model). Therefore, a comprehensive approach is needed, including better supply chain management,

increased system reliability, and thorough training for registry personnel to optimize the use of SmartCare in enhancing patient care.

The study findings also revealed that an unreliable electric power supply was another barrier to the use of SmartCare. The issue of an unreliable electric power supply poses a significant challenge to the implementation and use of digital health systems, such as SmartCare, in Zambia. The unreliable electricity supply significantly hampers the adoption and utilization of SmartCare through multiple mechanisms. Firstly, power fluctuations often cause hardware failures and erode user confidence in the system's reliability. This not only increases the risk of data loss but also introduces inefficiencies in healthcare delivery. Secondly, frequent power outages result in system downtimes, compelling healthcare workers to revert to paper-based record-keeping. These findings corroborate earlier research by Mweebo (2014), who observed a buildup of paper-based health records in rural health centers that are not entered into the SmartCare database due to lack of power, causing concern about the incompleteness of the national database used for investigation. The research findings also align with a study conducted by Mutale (2017), who revealed that SmartCare EHRs were not being used for decision-making in all the health facilities visited due to various factors, including the lack of reliable power supply. The findings of the current study do not align with the UTAUT2. The key determinants of technology adoption include performance expectancy and facilitating conditions (Venkatesh et al., 2012). An unreliable electricity supply primarily affects facilitating conditions and performance expectancy, reducing users' confidence in the system's reliability and their willingness to engage with it. However, the effectiveness of such systems heavily depends on consistent and reliable electricity. Therefore, the Zambian Government and stakeholders must prioritize enhancing the national power grid and investing in backup power solutions for healthcare facilities. It is crucial to establish policies and funding mechanisms that support the implementation of reliable power sources in healthcare settings to ensure uninterrupted service delivery.

The study's findings highlighted poor network connectivity as one of the challenges hindering the effective use of the SmartCare EHR system. Local Area Networks are necessary for computers to link and transfer information among the numerous service locations (Kaumba, 2023). However, in healthcare facilities in Lusaka, inconsistent internet access delays data retrieval and entry, reducing SmartCare’s efficiency. These findings align with Gumede-Moyo et al. (2019), who noted that

unreliable network connections caused delays in data synchronization, resulting in inconsistencies in patient records and hindering timely decision-making. Additionally, inadequate network infrastructure has been linked to diminished system efficiency, further complicating the effective utilization of digital health systems like SmartCare. The research findings are also consistent with the study conducted by Mwanza (2019), which revealed that network issues made it challenging for healthcare professionals to access and update patient information, leading them to prefer traditional paper-based methods over electronic systems. Poor network connectivity negatively impacts SmartCare by causing data synchronization delays, inefficiencies in patient care, and increased reliance on paper-based methods, which in turn affects key UTAUT2 constructs and ultimately reduces the adoption and effective use of the system. To improve SmartCare's reliability, strategies such as enhancing network infrastructure, enabling offline functionality, using alternative connectivity solutions, collaborating with telecom providers, and securing government support can be implemented to ensure seamless access and effective adoption.

In conclusion, this study objective identifies six critical barriers to effective SmartCare EHR implementation in Zambian healthcare facilities: frequent system failures causing operational disruptions, inadequate technical training for registry personnel, insufficient computer hardware, inconsistent SmartCare card supply, unreliable power infrastructure, and poor network connectivity. These interdependent challenges including spanning technical, human resource, and infrastructural domains collectively undermine system reliability (Mweebo, 2014; Mutale, 2017), compromise data integrity, and perpetuate reliance on paper-based systems. The findings reveal a concerning paradox where digital health infrastructure exists but remains underutilized due to systemic implementation gaps.

Theoretical analysis through the UTAUT2 framework (Venkatesh et al., 2012) demonstrates how these barriers negatively impact all adoption determinants: performance expectancy (through system unreliability), effort expectancy (via technical complexities), social influence (eroding user confidence), and facilitating conditions (lacking infrastructure). This explains the suboptimal adoption rates despite SmartCare's potential benefits.

Three priority interventions emerge from these findings: First, immediate infrastructure investments in stable power, network connectivity, and hardware provisioning. Second, comprehensive training programs addressing both technical competencies and change management. Third, establishment of robust maintenance protocols and supply chains for critical components like SmartCards. These measures would collectively enhance what Venkatesh et al. (2003) term "facilitating conditions" - the organizational and technical supports necessary for successful technology adoption.

The study contributes empirical evidence from Zambia's primary healthcare context to global digital health implementation literature, particularly highlighting how resource-constrained settings face amplified adoption challenges. Future research should explore cost-benefit analyses of proposed interventions and longitudinal studies of implementation improvement strategies. Policymakers must view EHR systems not merely as technological installations but as complex sociotechnical systems requiring holistic support mechanisms. Only through such comprehensive approaches can Zambia realize SmartCare's full potential in strengthening health information systems and ultimately improving healthcare delivery outcomes.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.0 Overview

This chapter highlights the conclusion of the study and its recommendations. The conclusions are based on each specific

6.1 Conclusion

In this study, the researcher investigated the role of the SmartCare Electronic Health Records System in delivering healthcare services in first-level hospitals in Lusaka District, Zambia.

The first objective was to ascertain the registry personnel's experiences and perceptions of using the SmartCare system for managing healthcare (medical) records. The study concludes that registry personnel in Lusaka's first-level hospitals perceive the SmartCare EHR system as valuable for improving healthcare records management. Its ability to streamline data processes, enhance accessibility, and reduce reliance on manual paperwork contributes to greater efficiency in service delivery. The positive user experiences align with the theoretical foundations of the study, the RCM, and the UTAUT2. SmartCare's support for longitudinal record-keeping and multi-stakeholder use reinforces the RCM's principles, while user perceptions of its usefulness, ease of use, and efficiency resonate with key UTAUT2 constructs. These results suggest that SmartCare is an effective EHR system that meets the needs of healthcare professionals, supporting improved record management and service delivery in Lusaka's healthcare facilities

The second objective was to determine the policy framework for managing records within the SmartCare health system. The study concludes that a critical implementation gap in Zambia's SmartCare EHR system, where inadequate policy awareness and inconsistent adherence to standards among registry personnel despite existing legal frameworks whose gap undermines the system's potential to enhance healthcare delivery. The findings underscore the urgent need for targeted training programs, strengthened policy communication, and robust compliance mechanisms to bridge the divide between regulatory frameworks and practical implementation. Addressing these challenges is essential to realizing SmartCare's full benefits as an interoperable, reliable health information system that meets both national objectives and international best practices for digital health in resource-constrained settings. Future efforts should focus on developing context-appropriate implementation strategies that account for the realities of Zambia's healthcare workforce and infrastructure.

Thirdly, the study ascertained the extent to which SmartCare has enhanced service delivery. The study concludes that the SmartCare EHR system has significantly enhanced service delivery in Zambian healthcare facilities by improving efficiency, accessibility of patient information, and overall quality of care, highlighting the need for broader implementation across the country.

Lastly, the fourth objective was to explore the challenges faced by registry personnel in the implementation of the SmartCare health system. The study concludes that the effective use of the SmartCare Electronic Health Records (EHR) system in Zambia is significantly hindered by challenges such as system failures, inadequate training, shortage of computers, inconsistent supply of SmartCare cards, unreliable power supply, and poor network connectivity that collectively hinder its optimal utilization. These challenges compromise the system's potential to improve healthcare delivery despite its theoretical benefits. The findings underscore the need for a comprehensive implementation strategy that simultaneously addresses technical infrastructure (stable power supply, reliable connectivity, and adequate hardware) while strengthening human capacity through targeted training and sustainable support systems. This dual approach is critical for transforming SmartCare into an effective health information management tool, with important implications for digital health initiatives in similar resource-constrained settings.

While migrating from paper records to an EHR system has its challenges, the benefits are undeniable. Deploying an EHR system is a key step toward modernizing healthcare. These digital records provide a comprehensive view of a patient's health journey, resulting in better patient outcomes, streamlined processes, and long-term cost savings. As technology advances, EHRs will continue to evolve, shaping the future of healthcare and the way patients and providers interact.

6.2 Recommendations

Based on the findings of this study, the following recommendations are made to the Ministry of Health to:-

i. Acquire more computers for all the registries for use with SmartCare.
ii. Sensitise registry personnel on the existing e-records management policies.
iii. Train the registry personnel to ensure they are familiar with existing HPCZ guidelines.
iv. Provide adequate training for registry personnel in the use of SmartCare.
v. Ensure a constant supply of smart cards for patients.

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APPENDICES

Appendix 1: Information and Consent Form for Registry personnel at the First level Hospital

The University of Zambia

School of Education

Department of Library and Information

Title: The role of registry personnel in the context of SmartCare electronic health records: A case of first-level hospitals in Lusaka district,

Section A: Information sheet for Registry personnel

My names are Misozi Ngoma. I am a Masters of Library and Information Science (MLIS) student at the University of Zambia, department of Library and Information Science in the school of Education. You are invited to take part in this research that is aimed at investigating; the role of registry personnel in the use of SmartCare electronic health records in the First level hospitals in Lusaka district,' as part of my master's degree requirements.

As a Registry Personnel responsible for managing both manual and e-records at this health care facility, you have been purposively selected to participate in this study by way of responding to this interview. The research will include answering a few background questions as well as questions about the use of SmartCare for managing records. Before deciding whether or not to take part in the study, you can talk with someone you feel comfortable with. Please feel free to ask me any questions.

You are also free to withdraw from the interview at any time if you wish to. You are free to ask for clarifications on questions that may not be clear to you.

Purpose of the Research

To investigate the role of registry personnel in the use of SmartCare at the first-level hospitals in Lusaka.

Type of Research Intervention

The study involves answering the interview guide that will be administered to you.

Participant Selection

You are being invited to take part in this research because of your understanding and knowledge in dealing with managing records using SmartCare

Voluntary Participation

Your choice to take part in this study is entirely voluntary. It is entirely up to you whether or not you want to participate. If you decide not to take part, nothing will change. Even if you had previously decided to take part, you can still change your mind and stop participating at any time, and nothing will change

PROCEDURES

You are invited to take part in a research study, and you have been purposely selected. If you consent to it, you are requested to tell us where you will be comfortable for the interview to take place. You will be interviewed with the help of the interview guide and digital audio recorder. If you do not wish to answer any one of the questions during the interview, you may say so, and the interviewer will move on to the next question. No one else but the interviewer will be present unless you would like someone else to be there. The entire interview will be digitally audio recorded on a memory chip, but no one will be identified by name on the memory chip. The information recorded is confidential and will be safely stored under key and lock. The recorded information will be erased soon after data analysis (90 days)

Duration

If you agree to participate in the study. The procedure will involve asking you some questions on the subject at your suitable time. The interview will be held once and will take at least 35 minutes to one hour.

Risks

If you feel the question(s) are too personal, you do not have to answer them or participate in the interview.

Benefits

There will be no direct benefit to you, but your taking part is likely to help us find out more about your role in the wake of SmartCare. However, the community may benefit in terms of improved quality of health care services in term of record continuity and easy access to records as a result of this research.

Reimbursements

You will not be paid any monetary benefits for taking part in this study

Confidentiality

The information that you will share with me as part of this study project will be kept confidential. To make sure that the information collected about you is kept as a secret, no one will be able to know you by name. In place of your name, your data will be identified by a code.

Sharing the Results

The results of this study will be shared with you through the respective hospitals. However, confidential information will not be shared.

Right to Refuse or Withdraw

You may not have to take part in this research if you do not wish to. You may stop participating in the interview at any time if you feel so.

Who to Contact

In case you have any questions or need further clarifications, you can ask them now or later after the interview. If you wish to ask questions later after the interview, please contact me on:

Misozi Ngoma

Cell: 0977 415 037

Email: misozik@gmail.com

Lusaka

This proposal or protocol has been reviewed and approved by HSSREC, which is a committee whose task it is to make sure that research participants are protected from harm. If you wish to find out more about the IRB, contact:

The Chairman
Dr. Jason Mwanza
Humanities and Social Sciences
Research Ethics Committee
University of Zambia
P O Box 32379
Lusaka.

OR

The Director
Professor. Henry M. Sichingabula
Directorate of Research and Graduate Studies
University of Zambia
P O Box 32379

Lusaka.

Section B: Certificate of Informed Consent

I have been invited to take part in this research on the role of registry personnel in the use of SmartCare electronic health records at the first-level hospitals in Lusaka. I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it, and any questions I have asked have been answered to my satisfaction. I know that my participation in this research will be anonymous. I know that I have a right to stop the interview at any time, and nothing will happen to me. I understand that I can choose not to answer particular questions that are asked in the research. I know that I will not be paid for participating in this study. I now voluntarily consent to participate in this interview.

Print Name of Participant: ________________________________

Signature of Participant: _________________________________

Date ___________________________

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant and, to the best of my ability, made sure that the participant understands that;

1. Interviews will be administered to them using an interview guide
2. Their answers will be recorded on the digital audio recorder and kept as confidential information.

I confirm that the participant was given a chance to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

Print Name of Researcher/person taking the consent________________________

Signature of Researcher /person taking the consent__________________________

Date ___________________________

Contacts for Questions to the Principal Investigator

Names: Misozi Ngoma
Phone: 0977 415 037
E mail: misozik@gmail.com

Physical address: Plot 6/38/4586, New Chilenje. Lusaka

Appendix 2: Interview Guide for Registry Clerks

TOPIC: The role of registry personnel in the context of SmartCare electronic health records System a case of first-level hospitals in Lusaka District, Zambia

I am a student of Master in Library and Information Science (MLIS) at the University of Zambia Department of Library and Information Science. I am conducting a study on 'The role of registry personnel in the context of SmartCare electronic health records System in the First level hospitals' as part of the degree requirements. To help collect relevant data, you have been purposely selected to participate in this study by way of responding to this interview.

Instructions:

Please answer all questions

Section A: Demographic information of respondents

1. Your gender____
2. Your age____
3. Length of service as a registry clerk_______________________
4. Highest level of qualification______________________________

Section B: Use of SmartCare for records management

5. With the introduction of SmartCare, what do you use it for?
6. How important is the registry in the management of patient records?

Section C: Policy framework and standards for managing e-records

7. Do you have a policy for managing e-records?
8. Are you aware of the existing policies and standards guiding the management of e-records?
9. Are you aware of any internationally recognized records management standards that govern e-records management? Please explain.

Section D: Extent to which SmartCare has enhanced service delivery

10. How has SmartCare enhanced service delivery in your hospital? Please clarify your answer.

Section F: Challenges of using the SmartCare system

11. What challenges have you faced with regard to the use of SmartCare?

Additional comments

12. Any additional comments/views on the implementation of SmartCare in healthcare service delivery?

Thank you for taking the time to answer this interview

Appendix 3: Interview guide for Registry Supervisors

TOPIC: The role of registry personnel in the context of SmartCare electronic health records System a case of first-level hospitals in Lusaka District, Zambia

I am a student of Master in Library and Information Science (MLIS) at the University of Zambia Department of Library and Information Science. I am conducting a study on 'The role of registry personnel in the context of SmartCare electronic health records System in the First level hospitals' as part of the degree requirements. To help collect relevant data, you have been purposely selected to participate in this study by way of responding to this interview.

Instructions:

Please answer all questions

Section A: Demographic information of respondents

1. Your gender____
2. Your age____
3. Length of service as a Registry Supervisor__________________
4. Highest level of qualification______________________________

Section B: Use of SmartCare for records management

5. With the introduction of SmartCare, what do you use it for?
6. How important is the registry in the management of patient records?

Section C: Policy framework and standards in e-records management

7. Are you aware of the existing EHR policies and standards guiding the management of e-records?
8. Does your hospital have a policy for managing e-records?
9. Are you familiar with any internationally recognized records management standards that govern records management? Please clarify?

Section D: Extent to which SmartCare system has enhanced service delivery

10. In your view, how has the adoption of SmartCare enhanced service delivery in your hospital? Please explain.

Section E: Challenges of using the SmartCare system

11. What challenges have you faced with regard to the use of SmartCare in managing patients' records?

Additional comments

12. What additional comments would you give to make SmartCare system adoption better?

Thank you for taking the time to answer this interview

Appendix 4: Proposed Timeline

	TIME LINE																						
ACTIVITIES	**2019 MONTHS**		**2020 MONTHS**												**2021 MONTHS**								
	N	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**
Research Topic formulation	■																						
Departmental Presentation of 1st year Research work		■																					
Refining of 1st Year Research Work			■	■																			
Preparation of 1st Draft of the Proposal					■	■																	
Editing 1st draft of the proposal							■																
Second Draft Preparation								■															
Editing and Refining of Second Draft of the Proposal									■														
Preparation of third draft of the Proposal										■													
Prepare Proposal for Ethical Clearance											■												
Presentation of the Proposal at graduate forum												■											
Writing Background Charter of the Dissertation													■										
Data Collection														■	■	■							
Data Analysis and interpretation																	■	■					
Writing and Binding of the Dissertation																			■	■	■	■	
Seminar presentation at DRGS																							■

THE UNIVERSITY OF ZAMBIA

DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE

Telephone: +260-211-290258/293937
Fax: +260-211-290258/293937
E-mail drgs@unza.zm

P O Box 32379
Lusaka,
Zambia

REF No. HSSREC: 2021-March-001

Approval of Study

13th April, 2021

Ms Misozi Ngoma
Principal Investigator
C/o School of Education
LUSAKA

Dear Ms Ngoma

"THE ROLE OF REGISTRY PERSONNEL IN THE CONTEXT OF SMARTCARE ELECTRONIC HEALTH RECORD SYSTEM: THE CASE OF FIRST LEVEL HOSPITALS IN LUSAKA DISTRICT, ZAMBIA"

Reference is made to your submission for ethical approval of the study captioned above.

The University Of Zambia Humanities And Social Sciences Research Ethics Committee IRB resolved to approve this study and your participation as Principal Investigator for a period of one year.

Review Type	**Ordinary Review**	Approval No. **HSSREC: 2020- March-001**
Approval and Expiry Date	Approval Date: 13th April, 2021	Expiry Date: 12th April, 2022
Protocol Version and Date	Version-Nil	-
Information Sheet, Consent Forms and Dates	• English.	To be provided
Consent form ID and Date	Version	To be provided
Recruitment Materials	Nil	Nil

There are specific conditions that will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are

adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

Conditions of Approval

- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved by an application for an amendment prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address or methodology and methods. Many modifications entail minimal risk adjustments to a protocol and/or consent form and can be made on an Expedited basis (via the IRB Chair). Some examples are: format changes, correcting spelling errors, adding key personnel, minor changes to questionnaires, recruiting and changes, and so forth. Other, more substantive changes, especially those that may alter the risk-benefit ratio, may require Full Board review and approval. In all cases, except where noted above regarding subject safety, any changes to any protocol document or procedure must first be approved by the IRB before they can be implemented.
- All protocol deviations must be reported to the IRB within 5 working days.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by The University of Zambia Humanities And Social Sciences Research Ethics Committee IRB must be filled in and submitted to us. There is a penalty of K500.00 for failure to submit the report.
- The University Of Zambia Humanities And Social Sciences Research Ethics Committee IRB does not "stamp" approval letters, consent forms or study documents unless requested for in writing. This is because the approval letter clearly indicates the documents approved by the IRB as well as other elements and conditions of approval.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of The University of Zambia Humanities and Social Sciences Research Ethics Committee IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,

Dr. J. L. T. Ziwa

VICE CHAIRPERSON
THE UNIVERSITY OF ZAMBIA HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE IRB

cc: Director, Directorate of Research and Graduate Studies
Assistant Registrar (Research), Directorate of Research and Graduate Studies
Acting Senior Administration Officer (R), Directorate of Research and Graduate Studies

All correspondence should be addressed to the
Provincial Health Director
Telephone: +260 211 256813
Fax: +260 211 256814
Telephone: +260 211 256815
Cell: +260 956 399643
+260 963 908260

REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH

In Reply please quote:

File No.:....................

Lusaka Provincial Health Office
P.O. Box 32573
LUSAKA

5th May, 2021

The Principal Investigator
Ms. Misozi Ngoma
University of Zambia -School of Education
P.O.Box 32379
Lusaka, Zambia

Re: Request for Authority to conduct Research

The above subject matter refers.

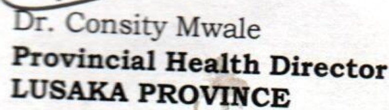
We are in receipt of your letter requesting for permission to conduct a research entitled **"The role of Registry Personnel in the context of Smart Care Electronic Health Record System: The case of first level hospitals in Lusaka district, Zambia."**

My office is glad to inform you that it has no objection to your request provided that;

1. The relevant District Health Director where the study is being conducted are fully appraised;
2. Progress updates are provided to Lusaka Provincial Health Office and the District Health Office biannually from the date of commencement of the study;
3. The final study report is cleared by NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University Leadership and all key respondents.

Kindly ensure minimum interruption in health service delivery to the selected health facility you will undertake your research.

By copy of this letter, the District Health Office and the Medical Superintendent at facility level are advised to allow you undertake the above mentioned research and provide you with the relevant support.



Dr. Consity Mwale
Provincial Health Director
LUSAKA PROVINCE

cc. The District Health Director – Lusaka
cc. Medical Superintendents – Chilenje, Chawama, Chipata, Kanyama and Matero

NATIONAL HEALTH RESEARCH AUTHORITY

Paediatric Centre of Excellence, University Teaching Hospital, P.O. Box 30075, LUSAKA

Tell: +260211 250309 | Email: znhrasec@gmail.com | www.nhra.org.zm

Ref No: NHRA00004/4/05/2021 **Date: 4th May, 2021**

The Principal Investigator,
Ms. Misozi Ngoma,
University of Zambia,
School of Education,
P.O Box 32379,
Lusaka, Zambia.

Dear Ms. Ngoma,

Re: Request for Authority to Conduct Research

The National Health Research Authority is in receipt of your request for authority to conduct research titled **"THE ROLE OF REGISTRY PERSONNEL IN THE CONTEXT OF SMARTCARE ELECTRONIC HEALTH RECORD SYSTEM: THE CASE OF FIRST LEVEL HOSPITALS IN LUSAKA DISTRICT, ZAMBIA."** I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA quarterly from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,

Prof. Godfrey Biemba
Director/CEO
National Health Research Authority