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CHANGE MANAGEMENT IN THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS SYSTEMS IN PUBLIC AND PRIVATE HOSPITALS IN THE ETHEKWINI MUNICIPALITY, KWAZULU-NATAL, SOUTH AFRICA

BY

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DECLARATION **STUDENT NO: 201058582**

I declare that **Change Management in the Implementation of Electronic Health Records Systems in the eThekwini Area, South Africa** is my own study, and I cited all the sources used including utilise directly quoted works. I have also indicated them in the list of references.

……. ……

Mandisa Msomi [Ms.] Date

DEDICATION

This work is dedicate to my strong mother who is my backbone and reason to keep moving on. Your endless support really means a lot to me. Thank you mom for instilling love for education in me and for always carrying me through your prayers. To my little sister Nompilo, may this work enlighten your journey and make you realise that the sky is the limit and nothing is impossible with God. To my one and only Aunt Joyce Nana Duze, thank you for taking care of me like your own child with my father in absentia, surely he is smiling down on us and proud. To all my family and friends, thank you for all your incredible love and support that really carried me throughout. Your care really proves that "*Umuntu umuntu ngabantu*". To Dlangamandla, my first love and my super dad; I definitely know you would have been proud because you were present loving father who wanted the best for his children. To Prof J. Mostert, you played a major motherly role in my life, when all failed me, you always held me like your own child. To Makazi Msomi (my loving grandmother), a big gratitude to you for being an unshaken rock in our family. Grandma, your presence and teachings in my life taught me to praise God in good and bad times. Thank you for always sending me hand-written letters of prayers I will certainly keep them forever. May heavenly father gives you more strength and good health at all times. Wena Nomndayi omuhle owehla ngomzungulu wasala wabola inyoni ezinhle ezawela umfula ukube aziwuwelanga ngabe zafa zonke, Singila!!

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ABSTRACT

The study examined change management practice in the implementation of electronic health records systems in public and private hospitals in the eThekwini area, Kwa-Zulu Natal Province, South Africa. The study is responding to the e-Health Strategy of South Africa set to provide road map for accomplishing well-functioning national health information systems to support delivery of health services. The study compared public and private hospitals in the development, execution and operation of electronic health records systems (EHR) systems. The study reviewed in-depth literature on the change management processes in the pre and post implementation of electronic health records systems, including user acceptance in the utilization of the system. The leading change model and technology acceptance model (TAM) model was utilized to evaluate changing behaviour of hospital employees towards tactical processes on their daily duties in the use of EHR systems. The study further assessed changes experienced by public and private hospitals due to EHR system implementation. It also evaluated the way hospitals monitor and measure success or failure of electronic health records systems.

The study adopted the pragmatic epistemology and pluralistic ontology to measures users' attitude towards the operation of the EHR systems and evaluated change management in its execution. The study adopted the mixed methods research approach. The study targeted a sample of 215 participants in both public and private hospitals. Out of which, 187 responded representing a response rate of 87.76%. The questionnaires were used to collect data from nurses, doctors, filing or ward clerks, receptionist and patient administrators. Qualitative data was collected through interviews from the hospital management. Descriptive statistics were used to describe frequencies with data presentation in bar graphs and pie charts; while qualitative data was thematically categorised and presented narratively. The two sets of quantitative and qualitative data from both the public and private hospitals were compared and contrasted in order to produce a single interpretation, and draw appropriate conclusions.

The findings of the study established that ill-defined change management approach and unbalanced user acceptance dissuade EHR system effectiveness and set back visibility of execution progress. The study confirmed lack of standard guidelines for both public and private hospitals in the establishment of procedures and policies guiding change management in the implementation process. This study confirmed poor user involvement in the execution of EHR systems. Therefore, this results to imbalance in change management visibility in the

implementation of EHR system as hospitals struggle to track effectiveness of the system and user acceptance. The study showed that there is a gap of change management directive in the eHealth Strategy of South Africa as there is no notable guidance in monitoring and evaluating the development and implementation of EHR systems.

In order to accomplish EHR system efficiency and meaningful use, the study recommends that official change management framework in the implementation of EHR systems should be developed. Similarly, the study recommends that standardised formal monitoring and evaluation processes need to be developed by the Department of Health in order to measure effectiveness and level of users' acceptance from pre to post implementation of the EHR system. The study recommends the Department of Health to liaise with the National Archives of South Africa towards developing policy and procedure manuals that may guide hospitals in the implementation of EHR systems in their operations.

Keywords: change management, electronic health records, health information technology, implementation, KwaZulu-Natal, private hospital, public hospital, South Africa

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LIST OF ABBREVIATION AND ACRONOMYS

DOH Department of Health (National or Provincial in South Africa)

ECT: Electronic Communication Transaction (Act)

EHR: Electronic Health Records

EMR: Electronic Medical Record

ICT: Information Communication Technology

IRMT: International Records Management Trust

ISO: International Standards Organisation

IT: Information Technology

NARSA: National Records and Archives Services

NARSAA: National Archive and Records Services of South Africa

NHI: National Health Insurance

PAIA: Promotion of Access to Information (Act)

POPIA: Protection of Personal Information (Act)

RCM: Record Continuum Model

TAM: Technology Acceptance Model

WHO: World Health Organisations

CHAPTER ONE

BACKGROUND OF THE STUDY

1.1 INTRODUCTION

For decades, most hospitals have relied on managing records manually using different formats of classification. However, hospitals are now changing to using electronic health records for the day-to-day functioning. According to Marutha (2016), electronic health records are complex to implement owing to human capital mind-set, electronic records management system identification, and organisational culture. In that regard, change management remains a central ingredient to the successful implementation of electronic health records system in South Africa (Katuu, 2015; Marutha, 2016).

The Online Medical Dictionary for Health Professional and Nursing (2012) defined health records as a comprehensive collection of data customarily placed in the medical records concerning patient's physical, mental and social health e.g. demographic information, next of kin, doctor's details, medical history, examination, diagnosis, treatment etc. Health records are used to validate daily statistical information (Marutha, 2011).Electronic health records (EHR) are therefore a digital version of patient's collected information available instantly and securely to authorised user's (Katuu, 2015). Schutznak and Fernandopulle (2014) explicated that, "digital age of medicine in upon us". However, they argue that efficacious adoption and implementation of electronic health records depends on understanding the factors contributing and influencing change management. Accordingly, electronic records management systems are intended to preserve the structure; validate content, framework and interactions of records to facilitate accessibility and sustain value for referral hand evidence (Hoffman & Podgurski, 2008).

Currently, most public and private hospitals or healthcare providers are adopting the use of technology for rapid and satisfying service delivery (Safran, 2011). Electronic health records may improve patient's safety and increase patient's well-being; but healthcare professionals need lifelong learning as things change and improve continuously due to technology (Marutha, 2016). Introducing electronic health records requires more effort to reshape the mind-set of healthcare professionals towards change in healthcare tactical processes (Weeks, 2013). Similarly, electronic health records practice is significant for improving hospital operation and service delivery in both public and private hospitals (Marutha, 2011). EHR implementation

influences workflow, workers and client's behaviour. Nonetheless, an in-depth understanding of change management approach is the key to successful change in both public and private hospitals (Deokar & Sarnikar, 2014). Furthermore, people who use the electronic health records and affected by it ultimately determine how successful the influence is within the hospitals (HP Solutions, 2012). The changes in private and public hospitals include introduction to electronic records management systems, new policies and procedures. However, the adoption of EHR often has less to do with technology and more to do with underlying changes in the business, clinical processes, workflow and daily tasks (Martin & Voynov, 2014). According to National Learning Consortium (2013), change management is about engaging and preparing people (behaviour changes), as well as maximizing abilities and reinforcing change. The goal of change management during *pre* and *post* implementation of electronic health record is to assist individual's transition through change for health organisations to have positive impact and meaningful use of the system (HITECH, 2012).

1.2 DEFINITION OF KEY TERMS USED IN THE STUDY

This section outline the key terms and concepts that are relevant for this dissertation. These terms and concepts form the suitable definition for the current study. These include change management, records, health records and electronic health records. The terms and concepts are defined below as follows:

1.2.1 Change management

Change management is attempting to address issues that can cause change to be poorly managed in an organisation (Cameron & Green, 2015). According to Paton and McCalman, (2008, p.3) change management is about evaluating, planning and implementing operational or tactical strategies to improve organisational services. Change management incorporates of organisational tools that used to help individuals make effective personal transition resulting in adoption and understanding change-taking place (Moore & Cole, 2017; Prosci, 2018; Health IT, 2016, p.2).

1.2.2 Records

Records mean information created, received recorded and maintained as evidence of information by an organisation or individual or organisational pursuit of legal obligation or during a business transaction. ISO 15489 (2016: section 316).

1.2.3 Health records

Health records is an ordered set of documents or a collection of data in a paper or electronic context that contains a complete and accurate description of patient's history, condition, financial, and medical information including diagnosis and therapeutic treatment (McWay, 2011 & Katuu, 2015).

1.2.4 Electronic health records

Electronic health records are defined as longitudinal person-centred system that allows healthcare professionals to access patient's records dispersed across multiple sites (Kalra, 2006 p136). The author further elaborated that electronic health records are held in a variety of paper and electronic format, characterised as a mixture narrative, structured, coded and multimedia entries. The Centres for Medicare and Medicaid Services (2012) defined electronic records as electronic version of a patient's medical history that is maintained by provider over time and may include all key administrative clinical data relevant to that person's care under a particular provider.

1.3 THE CONCEPTION OF CHANGE MANAGEMENT

Change management is the discipline that drives organisational success and outcome by providing support in form of preparing and training individuals to positively adopt to change being introduced (Prosci, 2015). The Office of the National Coordinator for Health Information Technology (2016, p. 2) elucidated change management as the execution of the set of tools, processes, skills and principle for handling the people side change to attain the required outcome of change development or initiative. Change in healthcare sector therefore concerns the use of health information technology and currently moving at a faster pace. In the context of the hospital setting, the execution and use of EHR systems affect the clinical processes for diagnosing and treating patients as task sequence and work flow changes which results in formation of new roles and duties (Deokar & Sarnikar 2014). Therefore, this might result in organisational restructuring if need be. Determining the importance of management of changes in core organisational process further contributes to the success implementation efforts of the EHR system (Deokar & Sarnikar 2014).

Preparing health organisation for effective EHR system execution comprise of taking holistic approach that consider all factors impacting behavioural change (McCarthy & Eastman, 2010). Furthermore, change management plays a critical role in transferring an organisation from a

present state to a desired future state (Fritzenschalt, 2009, p. 21). Change management mainly focuses on enabling the human transition from present to the future state and further emphasis on the complexities of human behaviour (McCarthy & Eastman, 2010, p.2). In another view, change management is often done when organisations are undertaking projects, or initiatives for improving performance, grasping opportunities, changing policies and processes, job duties, organisational structures and types and uses of technology (Prosci, 2015).

In the same token, people in the management of change are regarded as the most essential indicator of failing or successful change initiative or formation. Hence, change needs strong and focused leadership with clear direction (McCarthy & Eastman, 2010, p.2). Process of change management is an important aspect for reaching success factor in the EHR system adoption and use. Deokar and Sarnikar (2014) also asserted that organisational systematic processes are the dominant feature of change that leads the organisation to reach meaningful use of the system implemented. The researchers elaborated that those clinical and administrative branches of the hospital prompt management of change processes in the hospital setting.

Importantly, the application and utilization of EHR system is not only about practical endeavour but also about organisational adjustments. This attests to change management being the most fundamental element to customize and ensure effective use of the system. Weeks (2014) stated that technologist involved in the implementation of the health system confirmed that technology adopted was not a problem; however, changing organisational culture, and training health workers was far more challenging. This is one of the contributing concerns challenging the use and operation of EHR system and might be a result from imprecise change management approach.

In Prosci (2015) view, transformation in the organisation is based on people who have to change how they do their regular jobs. If employees are ineffective in their personal transition by lacking eagerness to learn new tactics and embracing change inevitably the whole initiative will fail. However, if employees adhere and oblige in adopting change, the change management initiation plan deliver expected outcomes. Change management is based upon processes that are reinforced for employees to change the existing organisational culture. Similarly, the use of change management creates readiness and willingness to change people within the organisation (Fritzenschalt, 2009, p. 22). It is noted that without managing change process, people in the organisation are likely to resist change and the innovations results in

implementation tragedy that is ineffective (Shonhe, 2017, p. 20). Deokar and Sarnikar (2016) emphasised on the necessity to study factors related to changing processes in the health sector due to EHR system use, in order to understand the impact of transformation in to workflow redesign and individual role in the organisation.

Change management cycle involves three components people, process and technology as illustrated in Figure 2.2. According to Thomas (2016, p.3) the functioning EHR system implementation necessitates people, process and technology. The current study views technology as the basis of change management influencing the organisational culture and processes. The current study focused on the human side of the implementation and operation of EHR systems. It further looks on how health employees are prepared by hospital leadership for effective use of the EHR systems. The predominant purpose of change management in EHR is to increase the rapidity of employee's successful changing to achieve projected benefits (McCarthy & Eastman, 2010).

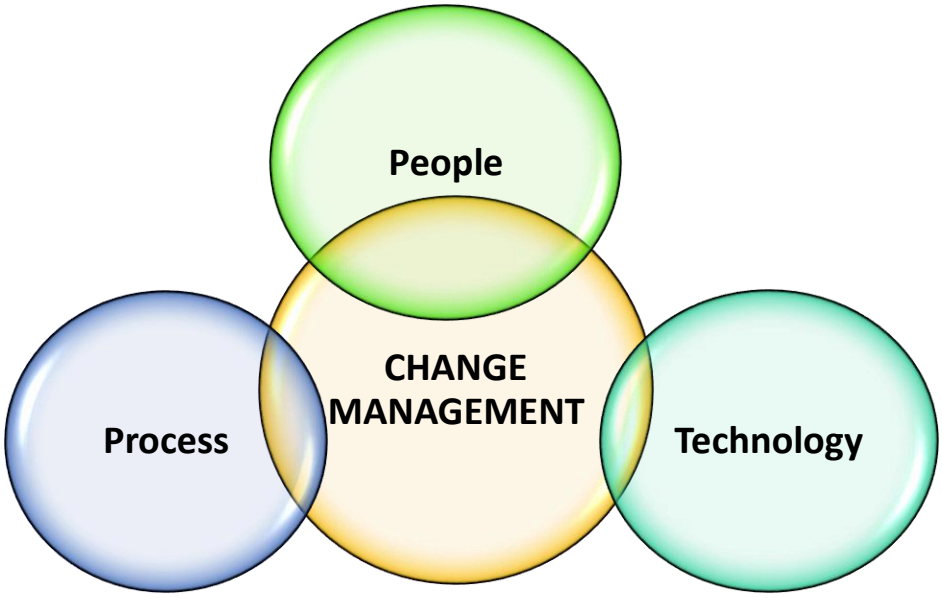


Figure 2.1: Change Management Cycle

Source: Prosci (2018)

1.4 IMPORTANCE OF CHANGE MANAGEMENT IN EHR SYTEMS

Change management has become a necessity for those organisations integrating the use of information communication technology (ICT) for effective service delivery. Fast technological changes and improvements have inclined the way corporate world functions weather in public or private sector (Shonhe, 2017, p. 19). The technological advancements have also influence the way in which people interconnect with one another. The term change is based on an initial motive, need and urgency of the situation and attempts to implement plans for change that lead to intended results (Heyes, 2014). Meanwhile, change in any organisation begins by taking a look at what happens; and when to start learning something new, individuals find themselves required or reinforced to adjust to new tasks in order to improve the business processes and service delivery (Cameron & Green, 2015). The above are in line with one of the objectives of the study, to determine changes experienced by hospital organisation during the implementation and use of EHR system.

Change is much of a learning process for all structures in the organisation; therefore, change requires essential shift in all areas of the organisational culture (Doppelt, 2017). Primarily, change management encompasses strategic planning, setting objectives, managing resources, deploying human capital, financial budget needed to achieve and monitoring and evaluating results (Hissom, 2009). This further implies that any organisation including the health sector adopting, implementing or integrating ICT in records management need to understand changes the electronic records systems brings to the daily operation of the organisation. The current study focuses on the change management in the context of EHR systems in public or private hospital. Based on the hospital setting, successful application of change management provide users with proper set of skill to easily use the EHR system, in order to satisfy their job requirements, needs of patients and fulfil the mission health organisation (McCarthy & Eastman, 2010).

2.4.1 The contextual of electronic health records systems in records management

There is some confusion about the difference between an (electronic health records) and (electronic medical records), though the health sector have used both terms interchangeably. The Office of the National Coordinator for Health Information and Centres for Medicare and Medicaid Services in the USA (2018) explained that EHR's broader focus is on the health of each patient; and EMR focus on personal data of each patient; and the word "health" which covers a lot more than the word "medical". The University of South Florida (USF) Health

(2018) delineated EMR as a single practice of digital version of a patient chart and patient's medical history. On the other hand, EHR is defined as a digital patient chart; however, more inclusive of snapshot of the patient medical history. EHR systems is designed to be shared amongst health providers. According to (Marutha, 2012, p. 41), electronic records in the hospitals should be preserved in such a way that it not easily or subjected to modification as it can mislead health professionals in decision-making.

The study adopts the term electronic health records as mentioned on chapter 1. The Health Research and Educational Trust (2010) stated that in a hospital setting, EHRs should be viewed as a tool to transform care systems and requires a clear vision (change management plan) linked with strong leadership and a shared commitment to action by all users including nurses, physicians, administrators, records keepers or even patients. Additionally, EHR has the ability to generate a complete record of a clinical encounter systematize and restructure the clinician's workflow (Obutu, 2018, p. 8). The proper records management in any organisation including the health sector is based on the established records management models.

2.4.2 Managing electronic records

The National Archives of South Africa (2006, p.10) defined electronic records as "information which is generated electronically and stored by means of a computer technology". Specifically, electronic record is created or generated, sent, communicated, received or stored by electronic means and it requires some form of computer technology to access and use (IRMT 2009, p. 22). Meanwhile, the current study is based on electronic records generated from health records, and it is practicable. It also linked to the records continuum model as it serves to enhance records life cycle, and guides it from the process of the records system design before creation; and it brings about ICT and electronic records management (Marutha, 2016, p. 12). Therefore, records management consists several models and the life cycle model that focus on tangible records and records continuum model consolidating both electronic and tangible records (Yusof & Chell, 2000).

2.4.3 Integration of ICT in records management in the health context

The introduction of information communication technology (ICT) in records management can be the best remedy to ensure effective service delivery in the public and private health sector. ICT systems are referred to as technology used for collecting, processing and disseminating information (Kalusopa 2011, p. 51). In records management, ICT can be introduced in two

different related ways in business and government administration (IRMT: 2009). These consist of electronic records management (ERM) and electronic document management (EDM) (Marutha, 2011, p. 33). The author stated that EDM system is reactive in the sense that it is created in a paper based format and thereafter converted into digital records by means of a scanner or microfilm to meet the challenges of a geographical space for storage. With the ERM system, the records are created digitally, maintained and used digitally until they are disposal.

In the view of the International Records Management Trust (2009), records management is not being given the attention it requires in the transition to the electronic environment. Marutha (2011, p. 32) also asserted that ICTs are introduced without crucial procedures to safeguard control and access to electronic records systems. Kalusopa (2016) underscored the existing ICT systems in different organisations remain ineffective because they do not integrate records management function. Crucially, electronic records are managed with the use of information technology "…and it needs to be integrated into the business process of the organization" (Johare 2006, p. 2). The study by Marutha (2016) in the Limpopo province attested to numbers of medical records being generated every day yet, no collaborative system such as Enterprise Content Management (ECM) to incorporate records management responsibilities. The author further elaborated current electronic systems as operated mainly on patient administration capturing only including personal information and billing data. Therefore, the system is not even capable of tracking movement of files or medical history of patients. Electronic records therefore need to fit into or improve the workflow process utilised by health professionals. Luthuli (2017), Katuu (2016), Kalusopa (2011) established that electronic records need to be properly created or classified from point of creation in order to be well managed, which therefore involve both records management and ICT personnel.

Importantly, it is the responsibility of the organisation to ensure that ICT provides trusted consistent, complete, unchanged and useable information, but this necessitates records management to be integrated in ICT systems during the planning phase and design rather than added during or after implementation (IRMT, 2009). However, several challenges maybe encountered in introducing the new system, hence the organisations need to be prepared through the change management plan. As regards the current study, some employees might be frightened or resist the new technological changes taking place therefore, the organisation needs to consider such things prior to EHR implementation as learning new operational way can be tough (Marutha, 2011). Hence, legislative framework should be considered primarily in

implementing or adopting new way of managing records particularly ICT, as working against the law may lead to various challenges and concerns.

1.5 THE USE OF HEALTH INFORMATION TECHNOLOGY IN SOUTH AFRICAN HOSPITALS.

According to the National Health Act (Act 61 of 2003), the South African National Department of Health (NDOH) have the statutory mandate to facilitate and coordinate the establishment, implementation and sustainability of comprehensive health information systems across the national, provincial and local levels, including private health sector (Department of Health, 2011). The use of health information technology are means to improve access and healthcare services; and South African public and private sector have recognised the need and importance of developing electronic health records systems (Department of Health, 2011: PAGE NUMBER).

The adoption of electronic health records systems in South Africa is driven by eHealth strategy that regulates the use of information and communication technology for health purposes (eHealth Strategy, 2012-2017). Furthermore, the national eHealth Strategy of South Africa is set to lead in improving patient's information systems nationwide (South African Health News Service, 2012). One of the aims of the eHealth Strategy of South Africa is to lay basis for future incorporation and coordination of eHealth initiatives in public and private health sector (eHealth Strategy of South Africa, 2012: 8). The eHealth Strategy is reinforced to ensure effective adoption and successful implementation (Emarus & Van der Walt, 2015, p.187)

The eHealth Strategy serves as a directive of acquiescence to overcome some challenges faced by the health sector, which include lack of technology regulation, lack of policy framework for all aspect of infrastructure for service delivery. Furthermore, the eHealth Strategy support the development of the National Health Insurance plan, which contributes funding into developing, integrating and improving the National Health Information Repository and Data-warehouse (National Health Insurance, 2015). The development of health information technology systems support and benefit the management and operation of NHI plan.

Katuu, (2015) argued that eHealth Strategy was expected to cover the public sector but also include the private sector from initial stage, not after policies already in place as the eHealth Strategy of 2012 specified. The eHealth Strategy of South Africa has insufficient directive on management of change in adopting health information technology for health organisations, this

therefore contribute to health systems not meeting the requirements to support health activities and producing data for monitoring and evaluation purposes of the national health systems.

In South African hospitals, technology had been introduced to enhance health service delivery (Katuu, 2015; Luthuli, 2017; Marutha, 2016), however the government is still in the process of introducing innovative system of healthcare financing that will have far-reaching effect on the health sector (National Health Insurance, 2017). Despite all the benefit that comes with the implementing of electronic health records systems in both public and private hospitals, the most important is the successful implementation, meaningful use and sustainability of the EHR systems (Katuu, 2015; Luthuli, 2017; Marutha, 2016).

Several researchers have recently studied health records in South Africa (Katuu, 2015; Luthuli, 2017; Marutha, 2016; Thomas, 2016; Kleynhan, 2011), yet the existing literature reveals little evidence on change management and electronic health records implementation in public and private hospitals in South Africa. It is in this context that this study examined change management in implementation of electronic health records in public and private hospitals in the eThekwini Area.

2.4.4 Legislative framework in management of health records in South Africa

Since the new democratic era, South African constitution has been developing and continuously amended to support records management including electronic records. However, supporting legislatives in the implementation of ICT in health records management is still work in progress (Luthuli, 2017). Legislatives form the most significant segment in management of records to control and organize any proceedings created and received by the organisations. Health information systems in both sectors have developed in different directions, with private sector health information systems focusing more on commercial aspects such as reimbursement and development of clinical and managed care interventions, in the public sector it mainly used for communication (South Africa Health Review on Health Information Systems, 2007, p. 90).

Legislative framework forms part for success of business goals in all corporate sectors, including the health sector (Marutha, 2018). Countless countries have established and introduced legislatives on how to regulate, maintain or retain records produced during various functional activities including those relating to the health sector (Marutha, 2016). Unlike the developed countries, African countries are struggling with ensuring best practice in many organisational strategies in records management (Ngoepe, 2014; Nengomasha, 2013).

In South Africa, the health system is divided into two segments: the public health care system fully owned and funded by government; and the private sector health care system funded by subscription of individuals from different medical schemes, sponsors or cash payment (Jobson, 2015). Additionally, organisations in the public sector fully manages records in compliance with countries legislatives guided by National Archives and Records of South Africa Act 43 of 1996 which requires all governmental bodies to have appropriate infrastructure, policies, strategies, procedures and systems in place to safeguard records in all formats guided by the International Standards Organisation (NARSSA, 2016).

According to the South Africa Health Review on Health Information Systems, (2007:90) the legislation framework to support the development and regulation of Health Information Systems in South Africa is still work in progress. The South African Health Review (2007, p.100) further stated that, "…legislation and policy do not provide clear guidelines for the flow and content of health information systems in the private health sector in South Africa". It is envisaged that the finalisation of these regulations will strengthen the implementation of health information systems and provide clarity on the health information flow between public and private health sectors. In addition, records in the private sector are slightly governed in a different manner compare to the public sector, as there is no full compliance with the NARSSA (Luthuli, 2017). The author further alluded that proper structured of records management policies can improve health service delivery if well formulated. It is necessary for any country to develop and implement framework that support and guide health care processes when it comes to records management (Katuu, 2015, p. 94). The records system, weather electronically or manually applied should comply with the current business requirements, regulatory environment and community expectations (Marutha, 2016). The implementation of electronic health records that is the focus of the study needs to be accounted for; also be done in compliance with policies and procedures (Marutha, 2012, p.40).

The South African National Health Act (2003) obliged all the information whether electronic or manual as concerned patients and their health status, or health facility to be treated as confidential. Based on the above, health institutions weather public or private have the responsibility to report to the National Department of Health for statistical purposes and therefore demand management of records to be well organised and accurate to do so.

Furthermore, several authors in their studies have conferred the legislative framework in management of records in South African health sector (Marutha 2018; Luthuli, 2017; Marutha, 2016; Katuu, 2016; and Katuu, 2015). All these studies did not in particular focus on change management plan in EHR system execution in line with the legislations .Luthuli (2017) focused on the level of compliance in governance in relation to the set legal and regulatory framework in public and private hospitals in uMhlathuze area. The author revealed that the private sector has it is own rules or policies drafted from the Head Office based on their mission and vision in relation to the Health Profession Council of South Africa (HPCSA) Luthuli, (2017)However, the private sector is guided and reports to the National Department of Health (NDoH). On the other hand, the hospitals in the public sector receive instruction on records management from NDoH and National Archives of South Africa, which is fully responsible for drafting policies and procedures; however, health institutions only utilise what compliment their organisations out of what they received from the department.

Katuu and Van der Walt, (2016) assessed the contextual legislation and regulatory framework of South African health care system and its impact on the effectiveness of records management in public health care institutions. The authors revealed issues relating to healthcare records management and legislations in relation to the eHealth Strategy; the implementation of EDM and ERDM; and utility of maturity model indicated that there is substantial legislative and regulatory discord in the management of health records in the country. The authors further stated that all regulatory guidelines from the national archives remain very general rather than specific to health, for example (Advisory Pamphlets).

Marutha, (2018) focused on the application of legislative framework for the management of medical records in Limpopo province. The researcher revealed that some health institutions in the Limpopo province did not understand the content of the existing legislative frameworks, which therefore may hinder the proper implementation of ERM systems. He further stated that healthcare professionals and record management professionals need to embark on the lifelong learning as RM systems changes with time, becoming more technical. The researcher further stated that existing legislatives need to be reviewed and improved from time to time as the technology advancement is upon the management of records.

Additionally, South African government has established legislation framework for healthcare institutions to adopt and utilise in policy and procedural development for management of records (Marutha, 2018, p. 2). Legal regulatory framework is the most essential part of records

management governance (Luthuli, 2018); Asongwa (2012) opined that African countries do not address the existing legislative framework extensively. The author explicated that there are existing gaps in legislative framework in management of records due to technology advancements and developments, and further state that the issue is not only exclusive to medical or health records management. Marutha (2018, p.3) indicated that legislative framework in records management need to be reviewed on a regular basis due to technology developments. One of the objectives of the study is look at the alteration adopted by the public and private health institutions in accepting the health information technology, which might affect processes and policies of records management guided by the legislation framework.

Studies from (Marutha, 2018; Luthuli, 2017; Marutha, 2016; Katuu, 2015; Katuu & Ngoepe, 2015) all found **Act no.43 of 1996 of the National Archive of South Africa** proper for governing records management in government departments. Moreover the health sector as envisaged by the constitution on National Health Act (No.108 of 1996) is mandated to regulate the way in which the health sector operate, protect patients right and guide them in case of matters arising (court cases, evidence or any complain laid against the hospital). The legislations below are regarded as South African legislatives for controlling information and managing digital records, supporting the National Health Act (No.61 of 2003); however, none of this Acts discusses in-depth or give legal directive or guidance on change management in adoption or implementation of EHR systems in the health institutions.

(a) National Health Act (No.61 of 2003)

The Act was introduced into South African health sector to provide outline for a structured undeviating health system within the country, taking obligations imposed by the constitution and other laws on the national, provincial and local governments about health issues or service delivery. The Act specifies the obligation to keep and manage health records related matters in all government segments. It oversees the functioning of both public and private health institutions in all areas. The Act has one common goal to actively promote and improve health systems in South Africa supporting the governance and management of health services within the national guidelines and norms. It also specifies that healthcare providers are entitled to examine health records (South Africa 2003bSec 16). On the hand, Section 13 of the National Health Act stipulates that health establishments must be maintained in line with National Archives of South Africa, 1996 (Act No. 43 of 1996) and the Promotion of Access to Information Act, 2000 (Act no 2 of 2000) for proper healthcare services continuity.

Katuu, (2015, p.107) alluded that the National Health Act is silent on the retention period of health records. However, the Health Profession Council of South Africa provides some guidelines for documents and material that are retained in order to use data for other administrative purposes; conduct clinical audit; keep directive evidence in litigation; use as research data; keep for historical purposes; serve as basis for accreditation and other upright intentions for health amenities.

(b) Promotion of Access to Information Act (Act no 2 of 2000)

The Promotion of Access to Information is mandated to facilitate public access to records in both public and private sector. The main purpose of this act is to encourage transparency, accountability by encouraging the public to understand and exercise their right and participate in decision-making. It grants constitutional permission to access any information held by the state or any individuals (Luthuli, 2017). According Promotion of Access to Information (PAIA), the definition of records is the same as NARS, the government institutions cannot forbid participants to access records both manual and physical (NARS, 2016). The current study mainly focuses on the utilised or followed processes or EHR system implementation in change management strategy. The PAIA Act is supported by section 14 of the National Health Act to ensure that health records are created and maintained in line with NASA (Act No.43 of 1996). Therefore, the responsibility to keep records in the health institutions is subject to role of PAIA Act in order to ensure healthcare service continuity even during the transition that might be carried by implementing or utilizing the EHR system.

(c) Protection of Personal Information Act (Act No.4 of 2013)

The **Protection of Personal Information Act (**POPI Act) was approved in the year 2013 to protect personal information processed by public and private bodies. It concerns safety and security of privacy of records or information. The POPI Act provides minimum obligation for processing of personal information, it offers the right of persons regarding unwanted electronic communication and automated decision making and regulates the flow of information with boarders of South Africa (Marutha, 2018, p.5). The POPI Act is supported by section 13 of the National Health Act No.61 of 2003, which stipulates that, the person responsible of health establishments must ensure that health records are created and maintained at the health establishments for every user of health amenities. It provides right of privacy against unlawful collection, retention, dissemination and use of personal information (Protection of Personal Information, 2013).

(d) Electronic Communication and Transaction Act (No. 25 of 2002)

The purpose of the Act is to provide facilitation and regulation of electronic communication and transactions, and built trust in electronic records. Katuu and Ngoepe (2015, p.137) referred **Electronic Communication and Transaction** (ECT Act) as one of additional legislatives in managing digital information in government institutions. The ECT Act promotes legal certainty in public administration and private businesses that are conducted or offered in digital form (South Africa, 2002a, p.16-18). The Act leads all ICT initiatives in the country by making provisions for the development of the national eHealth Strategy that aims to enable and facilitate electronic transaction in the public interest (National eHealth Strategy, 2012). Marutha (2018, p. 5) recorded that:

> "Section 11 to 17 of the National Health Act gives directives for issues relating to, among others legal recognition for data messages, written information, and electronic signature, originality of information or record admissibility and evidential weight of data message, retention and production of documents or information".

The ECT Act only states the general legal principles but does not necessarily provide details on guidelines on what organisations should implement in practice. However, in the case of the current study, health institutions might have implemented health information technology systems complimenting their nature of work and complying with the National Archives with no practical framework for the e-health strategy from the National Department of Health.

The study focuses on the EHR systems execution and the effect it has on the hospital(s) leadership, health professionals and its administration from *pre* and *post* implementation which to some extent, the initial implementation is compelled by the legislation. The recent literature revels that in South Africa there is no in-depth literature or legislative framework focusing on change management in the application of electronic health records in hospitals or management of records in any organisation for that matter. Although the eHealth Strategy support the adoption of Health Information Technology development (HIT), it does not really narrate how to manage change that comes with (HIT) application in management of health records. The eHealth development is similar to any other service delivery method, essential to be accounted for and be rendered in compliance with policies and procedures deriving from the legislations (Marutha & Ngulube, 2012, p.40).

1.6 LOCATION AND CONTEXT OF THE STUDY

The development and alignment of health Information systems in the Kwa-Zulu Natal province is still work in progress. The KwaZulu-Natal Department of Health embarked and operated EHR system years ago; yet, not all hospitals use the electronic records management systems. KZNDoH recently awarded Meditech with a contract to enhance further systems to be used throughout the province (Meditech, 2017). The hospitals benefiting from the implementation and upgrading includes Greys Hospital, Kwa-Mashu CHC and Ntuzuma PHC, Addington hospital, King Dinizulu Hospital Complex, and Inkosi Albert Luthuli Central Hospital situated in Durban, which is the first hospital to use Meditech 6.15 advance platform as from 15 August 2016. Nevertheless, no notable evidence or research study mentions the impact of change management in the *pre* or *post* implementation and operation of existing information health technology in KZN province, particularly in the eThekwini area.

The eThekwini Municipality in terms of social-economic position is among the wealthiest districts in South Africa (eThekwini Municipality IDP, 2017); and it serves as a wealthiest hub to its surrounding areas. The eThekwini area / Durban is located on the east coast of South Africa in the Province of KwaZulu-Natal (KZN) with an area of approximately 2297 km2 and a home to some 3.5 million people, thus comparatively larger than other South African cities. It consists of a diverse (cosmopolitan) society, which faces various social, economic, environmental and governance challenges (eThekwini Municipality, 2011). The eThekwini Municipality is one of the eleven districts in KZN; however, it stretches from Umkhomazi in the South, including some tribal area in Umbumbulu to Tongaat in the North, moving inland to some tribal area in Ndwedwe and ends at Cato Ridge in the west. Importantly, the election held on December 5, 2000 brought about amalgamation of seven council areas and the integration of some tribal land into one municipality area.

The study focused on two major categories of hospitals (private and public) with modern, facilities and offering quality health services in eThekwini area. The selected hospitals are as follows:

(a) Inkosi Albert Luthuli Central Hospital

This is the first hospital in South Africa to adopt public/ private partnership in the delivery of healthcare services. The hospital operates based on the paperless principle, with full electronic library facilities. According to MEDITECH (2018), Inkosi Albert Luthuli Central Hospital is

the first hospital in Africa to deploy and upgrade to MEDITECH 6.1.5 platform. The platform is electronic health records system that assist with hospital administration; HIV and TB related treatment; care and support services for terminally and chronically ill patients; mental related illness; offer services for pregnant woman also handle assessments and referrals. The 840-bed hospital went live in August 2016. It is located at Cator Manor, Vusi Mzimela, Mary Thiphe Street, Durban nearby N2 to the West and MIO to the East of the hospital. It is a tertiary and quaternary hospital, patients from other hospitals are referred via electronic/ telephone book system. The hospital offers primary healthcare services, which include radiology, pathology. The hospital has clinic, which consists the domains of medical, surgery, mother and child prevention, peri-operative and professional allied to medical support.

(b) **The private hospital X in eThekwini (Durban)**

The private hospital requested confidentiality, therefore the hospital name will not be mentioned throughout the study; as an alternative we refer the hospital as the private hospital. The private hospital is located in Berea in the city of eThekwini also known as Durban. It was established in year 2012; it owned and operated by different stakeholders. The private hospital has eighteen (18) stationed facilities providing different medical services comprising cardiology, neurology, pathology, orthopaedic surgery, paediatric neurology, plastic and reconstructive surgery, pulmonology, urology, oncology, gastroenterology among others. The private hospital also has rehabilitation centre for patients disabled by traumatic brain injury, stroke, spinal cord injury and other disabling conditions.

A pilot survey shows that both public and private hospitals selected for this study implement and operate EHR systems to delivery health services. The study only used two hospitals due to high sensitivity of researching the health sector and processes in place, that do not allow wider comparison of both public and private health sector. This study assessed change management practice in the implementation and utilisation of electronic health records systems using leading change model and technology acceptance model.

1.7 STATEMENT OF THE PROBLEM

For many years, South Africa has been attempting the implementation of electronic health records systems in both public and private hospitals. The eHealth Strategy of South Africa have identified change management as critical aspect for EHR system implementation. However, concerns and issues of managing change in the implementation has not been fully addressed

accordingly. Even though several studies (Luthuli, 2017; Marutha, 2016; Thomas, 2016; Katuu, 2015; Marutha, 2012; Weeks, 2012) pointed out the necessity of implementing electronic health records systems to improve health service delivery in South Africa; the question regarding management of change has not been fully examined in depth. For example, Luthuli (2017) in a comparative analysis of public and private hospitals in Kwa-Zulu Natal, acknowledged the need for the ICT integration to improve management of health records for public health service delivery. Nonetheless, the study does not examine change management in this integration process. Likewise, Marutha, (2016) focused on the assessment of medical records management in healthcare service delivery in Limpopo province, and identifies the need for adopting electronic health systems to ensure successful delivery of health services but fall short of recommending change management strategies in their implementation. In earlier study, Marutha (2012) also affirmed that, they have been partially implementing EHR systems but only dealing with personal details and billing with no effectual change management issues discussed. Katuu (2015) also assessed the effectiveness of health records management and alludes for a need to adopt EHR but did not go far enough to discuss implementation as well as issues of change management. Thomas (2012) however examined the EHR implementation in primary healthcare and underscore that the high degree of change that should be managed during *pre* and *post* adoption of EHR. This study was restricted to the primary healthcare, and did not involve any in-depth comparative analysis issues regarding change management in the implementation of EHR. Similarly, Weeks (2012) indicated that human socio-technology factors in EHR change needs to be actively managed nevertheless; the researcher did not deeply explicate how those factors will be addressed.

Clearly, the existing literature reviews diminutive evidence of empirical studies conducted on change management in implementation of EHR in South Africa, particularly in Kwa-Zulu Natal. It is in this regard, the researcher sought to evaluate comparatively, change management orientation in operation of EHR in public and private hospitals in eThekwini area. The study contributes to development of EHR framework that supports successful implementation of health information technology to improve health service delivery. Furthermore, the study provides insight on management of change to health care professionals, IT experts and records management personnel for the integration of ICT and improvement of healthcare and service delivery.

1.8 RESEARCH OBJECTIVES

The main purpose of the study was to assess change management in the implementation and operation of electronic health records systems in the public and private hospitals in the eThekwini Municipality, with the view to propose change management approach to improve the implementation and operation of EHR systems.

The objectives of the study were:

(a) To determine factors facilitating the adoption of EHR systems in public and private hospitals.
(b) To assess changes experienced by hospitals due to EHR systems implementation.
(c) To examine how hospitals monitor and evaluate the impact of EHR systems implementation.
(d) To determine tools used by hospital management to reinforce change and sustain results in the implementation of EHR system.
(e) To recommend change management strategies for electronic health records systems in public and private hospitals in the eThekwini Area.

1.9 RESEARCH QUESTIONS

The following were the key research questions of the study:

(a) What are the factors facilitating the adoption of HER systems in public and private hospital?
(b) What are the changes experienced by public and private hospitals due to EHR systems implementation?
(c) How hospitals monitor and evaluate the impact of EHR systems?
(d) What are the tools used by the hospital management to reinforce change and sustain results in the implementation of EHR systems?
(e) What change management strategies that can be recommended for implementation of EHR systems?

1.10 JUSTIFICATION OF THE STUDY

This study assessed change management in the execution of electronic health records system in public and private hospitals in the eThekwini area of South Africa. Recent literature reviewed focus on the execution and operation of electronic health records systems. The literature revealed that hospitals were faced with numerous challenges in the operation of electronic health records systems due to lack of ICT integration in records management, poor regulatory framework and insufficient change management information guiding the development of electronic records systems in health institutions (Katuu & Ngoepe, 2015; Luthuli, 2017; Marutha, 2016; Luthuli, 2017, Thomas, 2012; Weeks; 2013). The authors suggested the use of electronic heath records system, to improve health services delivery in hospitals with insufficient literature on change management in the implementation of EHR systems. Therefore, the current study compared management of change in the implementation and operation of EHR systems in public and private hospitals.

The research may assist the Department of Health in identifying gaps, current challenges encountered by hospitals in the solicitation and operation of the EHR system. The findings and recommendations of the study may contribute to the National eHealth Strategy of South Africa in developing EHR change management framework and maybe used by health institutions when adopting the health information systems. The study may also assist in evaluating the positive or negative impact the EHR system has on staff productivity.

1.11 SIGNIFICANT OF THE STUDY

The study is essential, as there is no notable study presently conducted on change management in EHR in South Africa. The study anticipates being beneficial to healthcare organisations on management of change in *pre* or *post* implementation of electronic health records system. The study forestalls to discover challenges faced by hospitals in implementing and operating electronic health records systems in South Africa, particularly in the eThekwini, Kwa-Zulu Natal. The study intends to provide the senior leadership, awareness on the important of change management during the execution of EHR system in both public and private health sector. The study anticipates assisting records management personnel IT experts, and health practitioners, to ensure effective healthcare service delivery, with the hope of enhancing other researchers to engage on the area of this study, especially in South Africa where such studies are infrequently

conducted. The study contributes to knowledge in eHealth Strategy of South Africa, which is set to lead the development of health information technology in the health sector.

1.13 THE ASSUMPTION OF THE STUDY

The study is based on the following assumptions:

1. There is no change management framework supporting the implementation and use of electronic health records system in hospitals.
2. There is no clear change management approach in the implementation and use of electronic health records system.
3. Electronic health records system is not effectively utilised for health delivery and hospital employees do not have necessary skills to use the systems.

1.14 SCOPE AND LIMITATION OF THE STUDY

The study is set out to assess change management in the implementation or operation of electronic health records systems among public and private hospitals. The study was limited to change management functions in the implementation in the EHR system in public and private hospitals in the eThekwini Municipality, KwaZulu-Natal. The study focused on the following trends sense of urgency for EHR system implementation, involvement of users in the implementation process, change management policies and strategies. The study further looked at monitoring and evaluation tools in EHR systems including user's acceptance in the EHR systems. It would have been ideal to compare more hospitals across provinces in South Africa, municipalities or districts since they operate with different organisational processes and EHR system use, but that requires enormous time and resources, which are not available for this study. The study excluded all groups or individuals who do not form part of the targeted population and do not have any form of encounter with EHR systems.

1.15 OUTLINE OF THE STUDY

The overall structures of the thesis consist of six chapters as follows:

- **Chapter 1**: This chapter provides introduction and background of the study, definition of terms, contextual settings. Thereafter, it provides statement of the problem, aim, objectives, research questions, justification of the study, significance of the study, and limitation of the study.

- **Chapter 2**: This chapter provides advanced literature review based on theoretical framework on change management in EHR system and further discuss empirical studies.

- **Chapter 3**: This chapter presents research methodology, the approach in which the study was conducted. This chapter further discusses research paradigms, research procedure utilised, study population and justification, data collection instruments, validity and reliability of the instruments, data collection procedure, problems encountered, during data collection process, ethical considerations and evaluation of research methodology.

- **Chapter 4**: This chapter focuses on the presentation of findings; and presents data analysis and interpretations using graphs and tables.

- **Chapter 5**: This chapter interprets and discusses finding presented in Chapter 4, and addresses the questions raised in Chapter 1 of the study. Findings based on the data collected in the research are discussed in this chapter based on the objectives of the study or research questions.

- **Chapter 6**: This chapter merges the study by summarising the research findings and making recommendations on the management of change in electronic health records system in the public and private hospitals in the eThekwini area. Conclusions and recommendations are provided in this chapter.

1.16 SUMMARY

This chapter focused on the introduction and background including the location and context of the study. The chapter also defined key terms used in the entire study. The chapter includes the problem statement, objectives and research questions. Additionally, this chapter presented assumption, scope and limitations. The chapter indicated the revolution in the health sector in South Africa and foregrounded the importance of change management in the implementation of electronic health records in hospitals. The next chapter focuses on the review of relevant literature.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents comprehensively research context through literature based on theoretical framework and models on change management in the implementation of electronic health records systems. Literature review is a critical evaluation of existing knowledge on a particular topic or subject, but must also be relevant to the overall scope of the study. This chapter also consolidates what already been researched and serves to identify gaps to allow the researcher to understand and establish relevant information on a chosen topic. Creswell, (2005: 79) defined literature review as written summary that describes past and present state of information, organized into themes. Similarly, literature review marks links across disciplines; articulated by comparing, contrasting and summarising information to develop new ideas or concepts (William, 2011, p.61).

In this study, the literature review focuses on the following themes:

- Theoretical framework on change management and technology acceptance.
- Factors facilitating the adoption of EHR systems in public and private hospitals.
- Changes experienced by hospitals in EHR system implementation.
- Monitorand evaluate the effect of EHR systems in hospitals.
- Tools to reinforce change and sustain results in the implementation of EHR systems
- Empirical studies on change management strategies for EHR systems.

2.2 THEORETICAL FRAMEWORK IN CHANGE MANAGEMENT AND TECHNOLOGY ACCEPTANCE

Theoretical framework is one of the most vital aspects of the research process. Kerlinger (1986 in Molefe, 2014, p. 10) delineated theoretical framework as two separate words. Theory is therefore defined as a set of interconnected concepts, definitions, references and proposition that present a methodical view of the phenomena by stipulating relations among variables with the purpose of elucidating and predicting variables, the framework referred as a set of concepts used for forming decisions and judgements. The theoretical framework serves as the basis support structure for the feasibility of study (Grant & Osanloo, 2014, p. 12). On the other hand,

Boonstra et al. (2014, p. 5) viewed the theoretical framework as way of thinking and looking into subject matter and primarily on the assumption about the nature of the subject matter

In the subsequent section, the review of some relevant literature covers the following models and theory in line with the objectives and illustrates their relevancy to the current study.

- Change management model
- Technology acceptance model

2.2.1 Theoretical framework of the study

There are several existing theories in change management depending on the organisational motive driving the alteration. According to Greener (2018), change management models comprises of organisational wide change, bottom up approach that both focuses on refining tasks or processes and employees focus which emphasis on motivating employees and gaining momentum to easily adjust to the change process. The study used leading change model with Technology Acceptance Model (TAM) to understand various factors that determine the adoption, acceptance and use of electronic health records systems in both public and private hospitals in the eThekwini area, Kwa-Zulu- Natal. Therefore, this a theory triangulation that involves at least two set of theories interpreting single set of data (Saldana & Omasta, 2017).

2.2.1.1 Leading Change Model

The leading change model is a more detailed approach compared to other change management models. In 1995, John Kotter introduced the model in the eight-step of change process in the book called *The Lead Change*. The author indicated that too many managers do not realize transformation is a process not an event; and without sensible vision, a transformation can easily dissolve into a list of confusing and compatible projects that can take the organisation in the wrong direction and nowhere.

The **eight steps** was introduced by Kotter (1995) from over thirty years of research, and the theorist mentioned that, 70% of all major changes fails due to organisations' failure to take holistic approach required to see the change. According to Kotter (1996), change progress can fail, be unsettled or hindered due to organisational culture, administration, politics, lack of trust, lack of teamwork, negative attitude, lack of leadership and fear of the unknown.

Similarly, the change management model improves leader's chances of moving organisation to the desired futuristic vision. Kotter (2007) asserted that the model is mostly beneficial for

understanding potential barriers that might face the organisation. This is closer to the conclusion by Martin and Voynov (2014, p. 627) that applying change management model in EHR implementation is likely to increase possibilities of success change effort. Referencing to Kotter model, EHR transformation has both emotional and situational components (National Learning Consortium, 2013). In another view, the College of Healthcare Information Management Executive Organisational (2010) stated that culture transition could build or destroy the health sector, if not all spheres affected by change are involved. Primarily, from initiation stage of change management in any organisational setting, people's feelings need to be taken into consideration throughout the process. The previously mentioned eight steps are discussed below as follows:

Step 1: Establish a sense of urgency

The healthcare organisation need sense of urgency around the necessity to change in order to spark the initial motivation and getting things moving from EHR system initiation stage. According to Kotter (1995), leaders who understand the importance of urgency are good at taking pulse of their companies. Kotter (2007) stated that developing sense of urgency for most organisations fails due to motivation coming primarily from the top management instead of operation managers who largely comprehends most challenges facing the organisation from ground. However, change management initiation becomes more effective through vigorous leaders who bring different ideas and high level of eagerness into project implementation (Kotter & Schlesinger, 2008). This requires that factors leading to change have to be well articulated and well understood in the implementation and operation process hence, *pre* and *post* evaluation plays a major role in keeping consistence of the change practice. Therefore, the goal is to get all employees or parties motivated to steer organisation towards greater future in line with the change progression.

Step 2: Create a guiding coalition

Implementing change requires designated group of individuals that have strong influence to lead and change current state of the organisation to future visionary state by formulating techniques to be applied throughout the change process. Martin and Voynov (2014) stated that coalition members have to be from different departments, be intelligent and respected healthcare leaders, dedicated and understand hospitals best interest. This implies adding credibility to the change initiative and ensures organisation wide participation towards a common goal as change management leaders need to make certain adjustments or

improvements on organisational processes and culture (Lorenzo et al. 2009). Studies conducted on change management in EHR by McCarthy and Eastman (2013); National Learning Consortium (2013); and Martin and Voynov (2014) supported the idea that implementation of EHR requires a strong steering committee representing all parties in the hospital, to constantly manage change through team meetings. The authors further elaborated that spending time with individuals who are actual or potential users of the system continuously provide clear direction and assist in monitoring the implementation and operation of the system.

Step 3: Develop a clear-shared vision

The vision developed need to be clear, and state how it different from the past. A clear vision will help healthcare providers in hospitals understand why certain tasks need to be carried out by them. By doing so, people will see what the initiative is the organisation trying to achieve, the directive given will make more sense (Kotter, 1995).

Step 4: Communicate the vision

Communication needs to be embedded (written or verbal) on everything being done in the project. Demonstrate and promote the vision by using other means of communication available in hospitals. Kotter (1995) stated that gaining an understanding of a new direction is never an easy task particularly in a multiparty organization. However, communication breakdown and inconsistency might have negative effect on the transformation process. Hence, managing organisational culture by frequent communication is gradually viewed as crucial part of health information system reform as it allows each person involved to easily understand the direction the organization is moving towards (Antwi & Kale, 2014, p.2).

Step 5: Empower people to act on a vision

According Kotter (1995), change leaders whose main role is to display change, need to be identified while hospital organisational structure, job description, performances and compensation need to be re-evaluated to ensure that, they in line with the vision prior to EHR change implementation. It is important for health organisations to empower, recognise staff for making change happen; and people who are resisting change need to be identified and be helped to understand what is/are needed. Importantly, any barriers need to be removed rapidly for EHR change process to run efficiently.

Step 6: Create a short-term goal

Kotter (1995) viewed the change process as long and challenging processes, which essentially require long-term vision of healthcare organisational future to be broken down into smaller set of successive activities that can be dually measured. This will allow the hospitals to manage its workload and identify problems in the change process as they occur and allows EHR process to become more visible.

Step 7: Consolidate and build on the gain

Short-term goals and wins need to be generated for innovation and successful EHR change process (Kotter, 1995). This will create a great launching pad for health organisation to continue with change initiative. This shows that lesson learned from short-term wins and change approach adopted by the organisation must be institutionalised to increase ability to adapt to a changing environment. Kotter (2012) further established that without sufficient consistent leadership, the change will stall and succeeding in a rapidly changing world becomes highly problematic. Celebrating short-term accomplishments keep the participants engaging while building the energy to ensure that successful changeover transpires

Step 8: Institutionalise the change

Kotter (1995) stated that continuous effort would need to be ensured in every aspect of the health organisation for change to be visible. This suggests that corporate culture will often determines what are done, thus the value behind the vision must show on the organisation daily functioning. Furthermore, the top management must set the tone for the vision and walk the talk of embracing change by rewarding innovative and creative healthcare employees for effort in implementing successful EHR change initiative.

2.2.1.2 Technology Acceptance Model

Technology Acceptance Model (TAM) is one of the most effective frameworks for forecasting users' perceptions about information system use (Gagnon, et al. 2014). One of objective of the study is to assess changes experienced by hospitals due to EHR systems implementation and explain the level of acceptance of EHR in both public and private hospitals. According to Surendran (2012), technology acceptance model has been widely used and verified by different authors to explain users' or individual's acceptance behaviour in an information system paradigm. The model is presented in below in Figure 2.1

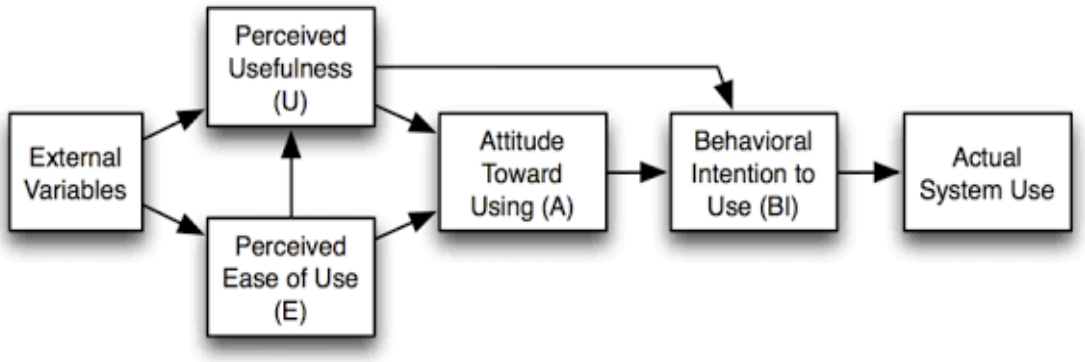


Figure 2.2: Technology Acceptance Model

Source: Davis (1989) Davis established the technology acceptance model in 1989, and. according to Surendran, (2012), TAM model consists two most important components named **perceive usefulness** and **perceived ease of use** which are pertinent in computer users behaviour. Davis (1989) explained perceived ease of use as prospective user expectation to utilise the system effortlessly without any difficulties. On the other hand, Davis (1989) defined perceive usefulness as prospective users' objective chances that using a certain information technology system will improve employers' job or life performance.

The above-mentioned factors are influenced by **external variables,** which are (social, cultural and political factors). Social factor consists language, skills and facilitating conditions (e.g. support, training, access etc.) all the things that will support users to use the technology; while political factors is primarily impact of using technology in politics and political crisis.

Importantly, the **attitude to use** is apprehensive with users' evaluation of the interest of engaging the application**. Behavioural intention** is the probability of a person employing the application system implemented (Surendran, 2012). However, the end-point is **actual use** of the technology that has to be formed by behavioural intentions to users and that intent is influenced by **attitude**.

In another significant event, Vankatesh and Davis (2000) extended the Technology Acceptance Model into TAM2. The aim of TAM 2 was to keep original TAM concept intact and include additional key factors of TAM's perceived usefulness and usage intention concept to comprehend how effect of these factors change with accumulating users' experience in the long

run and the target system (Vankatesh & Davis, 2000). The study chose the original TAM as it was designed to address users' factors in system technology because TAM 2 only emphasised the basis of TAM perceived ease of use, and usage intention concepts for sturdiness (Lai, 2017, p.7).

2.2.2 Relevance of the Theoretical Framework to the Study

The study adopted Leading Change Model (LCM) in integration with Technology Acceptance Model (TAM). The two models were adopted in the study to assess change management in the implementation and operation of electronic health records systems in the public and private hospitals in the eThekwini Municipality. The models were chosen based on the earlier studies by Martin and Voynov (2014) that utilised the LCM with TAM to assess the implementation and operation of EHR in physician practices. TAM has a sturdy element to assume that when an individual forms an intention to act, do it freely without any constraint (Kalusopa, 2011, p.56). Martin and Voynov (2014) also opined that TAM model is a suitable complement to Kotter's Leading Change Model (LCM) that focuses on the perception of the group (healthcare providers) experiencing change in relation to specific variables such as perceived usefulness and ease of use due to EHR system implementation. Crucially, both models allow the researcher to get an insight of the *pre* or *post* implementation and acceptance of the EHR system; even if the EHR implementation was done years back. The study involved participants from hospital top management to healthcare workers in their respective disciplines.

The LCM model and TAM model evaluate changing behaviour of hospital employees towards tactical processes on their daily duties in using the electronic health records management systems. Martin and Voynov (2014, p. 629) indicated that Kotter's change management model serves as a foundation for understanding complex setting. In the current study, both public and private hospitals are complex in part because of different health professionals within the organisation, which include top management, physicians, nurses, and administrators working directly or indirectly with EHR system (Antwi & Kale, 2014, p. 2).

As mentioned earlier, the study focusing the enactment of electronic health records systems requires change inventions for users to efficaciously operate the technology system; and LCM focuses on the change effort from all part of the hospital structure. The model has the ability to identify certain changes that are not operative as it entails methods for implementing and sustaining change. Leaders of change although need to ensure healthcare providers understand

the vision for successful change to happen. Furthermore, the reinforcement of change management approach in the operation and implementation of EHR systems in hospitals commences with the appropriate resources, leaders, managers and technologists having the understanding that strategic decision does not only involve technical decisions but also social decisions (Martin & Voynov, 2014, p. 629). Meanwhile, TAM model has been verified for adequate predictability; although it might have some restrictions such as limited ability, time, environment or organisational limit or unconsciousness to healthcare professionals (Kalusopa, 2011; Gagnon et al., 2014). As needful, LCM minimises the limitations from using TAM by creating the short-term wins that regularly can be monitored and evaluated to measure theimpact of the technology use the in hospitals. Furthermore, both theories provide comprehensive understanding on the importance of change management in the implementation of EHR in hospitals. Therefore, the models support the study to assess change management effectiveness in the adoption and operation of EHR system

2.5 FACTORS FACILITATING THE ADOPTION OF EHR SYSTEMS IN HOSPITALS.

One of the objectives of the study is to determine factors leading hospitals to implement EHR systems. The objective review of how these issues reinforced or motivated the health institutions to change or improve the way in which health records are managed. Health records contain sensitive patient information, therefore when transformed or created in an electronic format it needs to be handled with care, protected from any reform or manipulation in order to keep it is state of originality. The key goal of records management is to maintain records authenticity and ensure its accessibility, with safety, security, confidentiality and privacy throughout its life span (Kalusopa & Ngulube 2012, p.203).

South Africa is swamped with inequitable health service delivery between the rich and the poor among the citizensn with different needs and demands, however the use of technology is anticipated to improved quality health (Yogeswaran & Wright, 2010). The country is still one of many developing countries that continue to battle with ways to improve state owned facilities to provide better health service delivery (Luthuli, 2018). East and Southern Africa Regional Branch of the International Archives (ESARBICA) for instance are way behind despite the adoption of technology in management of health records (Marutha & Ngoepe, 2012, p.14). The researchers emphasised South Africa and Kenya as a good example of incompetence in records management automation. Katuu (2016, p. 333) mentioned that two

official fundamental instants in the alteration trail of the health sector in South Africa, the year 2003 where the National Health Act was transmitted and nearly a decade later where the eHealth Strategy 2002-2017 was issued and circulated.

The use of information technology system in the heath sector is viewed as a way to address the inefficiency and to assist in reducing the inequity gap that was perpetuated by apartheid era (Luthuli 2018; Katuu, 2016). The study by Kleynhans (2011) on *"South Africa Ready for a National Electronic Health Record?"* revealed that South Africa has long joint other countries in the implementation of the National EHR system as part of the National eHealth Strategy. The author stated that the official adoption of the health technology in South Africa dates back in year 2002, where workshop was held and three groups were formed namely: *Laboratory System Working Group*, *Evaluation of Health Information Systems* and *Electronic Health Working Group*. The initiative started in September 2003 after the workshop that standardised the National Electronic Health Records concept.

The author further elaborated that the National Department of Health then formed the basis of the National eHealth Strategy and defined the goal of the "*Electronic Health Records"* as:

- To integrate health record systems by consolidating different health information systems facilitating access to health records within provinces and across provinces.
- To establish a population health care based.
- To advance the efficiency of health service delivery in public and private health amenities.
- To improve governance, planning and administration and management of health systems national and provincial.
- To enable national monitoring and evaluation of health trends.
- To achieve complete privacy and discretion requirements of the citizen.

The South African Health Review in Matshidze and Hanmerii (2007,p.90) argued that the establishments and application of electronic health systems has largely been supported and emphasized on public sector than in the private sector by the government with the basis of the National eHealth Strategy. The researchers further stated that tactics to improve and develop National Electronic Health Records were also intended to offer significant and effective mechanism to assimilate data for patient care in both public and private health care segments. The National Department of Health and Council of Scientific Research and Industrial Research,

(2014:17) echoed that investments made by NDoH in the eHealth Strategy have received local benefit; however, have not created "desired" network outcome because of lack of interoperability which is referred as two or more ICT systems supporting exchange of business information among diverse IT systems.

Although South Africa has long joined forces to advance management records in the health sector, recent literature indicates that hospitals are still experiencing challenges in record keeping and administration. Several researchers (Luthuli 2017; Marutha 2016; Thomas 2016; Katuu 2015; Pyrene 2015, Weeks 2014; Martin & Voynov, 2014; Marutha 2012; O'Mahony, Wright, Yogeswaran et al.; 2014; & Gunnlaugsdottir, 2008) have discovered common issues in health records management which at most facilitates hospitals to adopt EHR as follows and not limited to:

2.5.1 Adequate storage online for record keeping

Storage seemed to be one of the contributing factor in ineffective record keeping in the health sector. As indicated by Martin and Voynov (2014), usage of physical space for medical storage consequences to lack of physical storage. Luthuli (2017) noted that hospitals are challenged with limited spaces to keep records which results to misfiling and loss of some records. Martin and Voynov (2014) also indicated that when hospitals adopt the use of electronic health records system, the limited physical space could be utilised for other vital administrative hospital duties.

2.5.2 Avoiding misfiling orloss of patients files

Concerns comprising negligence, misdiagnosis and treatment have been allied to futile and poor record keeping for several times in hospitals (Luthuli 2017, Marutha 2016, Pyrene 2015, Katuu 2015 and Marutha 2011). According to Marutha (2016:286), innovation for records management framework may bring appropriate outcome of managing medical or health records that is free from misfiling or missing documents. Marutha (2017:4) asserted that lost or missing files result from ineffective security measures and absent audit trials for track records. Pyrene (2015) established that misfiling and missing patient's folders undermines the quality service delivery at the Victoria Public hospital in the Eastern Cape. Thus Katuu, (2015) commanded that introduction of an HER system can capture and provide access to a full patient's record, and track paper movement regardless of location.**2.5.3 Lack of privacy and security of patient's information**

Privacy and security concerns of patient's information is considered the largest barrier in hospitals (Kruse, et al., 2017). According to Su et al. (2006) the use of EHR systems can highly promote privacy and ensure security of patient information in hospitals. The safety aspects of EHRs can be summarized as: identification, system security, privacy, confidentiality, consent, disaster recovery, storage, back up, retention period, data standards, data interoperability, data integrity, medication, alerts, data entry, attributes of data quality, and system quality (Su et al., 2006). The authors additionally stated that EHRs contain sensitive health data of individual patients, thus it is essential that these systems are both secure and error free (Su et al., 2006). On the other hand (Litha et. al., 2015, p.5) emphasised that EHR systems needs to be secured, shared and retrieved electronically by only authorised healthcare workers

2.5.4 Prescription error due to poor hand writing

Unreadable handwriting can lead to unnecessary test, treatment delays and inappropriate doses that can result in discomfort and death (Sakol & Hettige, 2006, p.645). Poor hand writing causes loss of information and prevents better care of patients. Without detailed and precise accessible of patients case notes or prescription, medical personnel may not be able to offer the best treatment, may however misdiagnose a medical condition and give incorrect prescription (IRMT, 1999, p.2). Therefore, recording patient information in EHR systems easily allow health employees to do their administrative duties and treat patients (Sakol & Hettige, 2006).

2.5.5 Long queues for admission

Many patients in public hospitals waste a lot of time in long queues waiting for files to be retrieved prior to being attended by medical personnel (Weeks, 2013; Luthuli 2018). The authors indicated that this is due to the manual system used to retrieve files, shortage of record management staff and the file tracking system that is apprehensive and challenging to the workflow of the health service delivery. Luthuli (2017) disclosed that at Ngwelezane Public Hospital, record-keepers indicated that the manual record system utilised by the hospital is time-consuming and laborious. Marutha (2012) stated that failure to meet records management requests typically results in extended patients waiting times and patients being treated without medical history.

2.5.6 Incompetent data gathering for health statistical purposes

Health records fulfil numerous functions in hospitals but the primary purpose is to support and improve health service delivery. One of the problems highlighted by the eHealth Strategy of

South Africa, (2012-2017) is health systems are incapable in information management hence there is poor data gathering. Similarly, inadequate records management as well as misdiagnosis and wrong prescription results to false statistical reporting (Marutha, 2012). Furthermore, data generated in the health delivery process between healthcare institutions and patients is crucial for ongoing monitoring and evaluation to health services and support economic and social values (Thomas, 2016, p.12). According to the eHealth Strategy of South Africa, (2012-2017) the use of electronic health system can assist the Department of Health and hospitals in accurate data reporting.

2.6 CHANGES EXPERIENCED BY HOSPITALS IN EHR SYSTEM IMPLEMENTATION

There are notable changes and benefits of EHR system mentioned by different studies. Martin and Voynov (2014) summarized the benefit of using EHR system as less time spent when retrieving files, entering data into spreadsheet and duplication of data. According to Mpofu (2014, p.4), enhancements in data quality comprise of accuracy, timeliness, validity and completeness; audits and standardisation of data collection tools adds to the apparent improvements in correctness and completeness reporting in the health organisations. The benefits also include more transparent platform for billing patients and tracking paid or unpaid, sent or unsent claims, rarer missed appointments and double booking (Martin & Voynov, 2014). It was further stated that the system minimise health employees to work on the patient chart at the same time. The authors additionally viewed EHR as important since it improves patient's safety and privacy.

Taiwo, et al. (2016, p.18) indicated that the use of electronic health records in hospitals decreases medical errors, enhances better clinical decision making by integrating patient information from multiple sources, improves patients safety, improves efficiencies and lowers healthcare costs by promoting preventative medicine and improved coordination of healthcare services, as well as reducing waste and redundant tests. An EHR does not only benefit the patients; it also benefits heath employees; assisting them with their duties; and daily routines (Kleynhans, 2011, p.12). Similarly, electronic health records system has the potential of improving staff productivity; patient factors such as efficiency in supplying health care; patient waiting times; continuity of care; and patient monitoring influenced the use of EHR (Moomba, 2017, p.23). The use of electronic health records system also nurtures capability and advances staff productivity just as it improves communication between medical personnel.

2.6.1 Challenges facing hospitals in the use of electronic health records systems

The challenges encountered in the EHR implementation derives from managerial knowledge gap (Kitty et al., 2016). EHR system failure is considered a managerial fault than technical as it mostly derive from lack of change management plan and EHR system sustainability plan (O'Mahony et al., 2014). Often times, health care leaders find themselves partake in responsibilities for leading change without adequate preparation (Stuyler, 2011). Deokar and Sarnikar's (2014) opinion, an in-depth understanding of change management is vital as many critical EHR implementations involve changes to core organisational process in healthcare organization. Therefore, this involves all participants from the top management, health workers who render health services to patients, and administration personnel involved in the development or restructuring of change. On the other hand, Erasmus and Van der Walt (2015) highlighted that although EHR system might be beneficial to senior management and government in guiding state resource where necessary, the most important people are on the operational level who might be fraught and failing to take advantage of utilizing the system. Therefore, system implementation failure, are not limited to the following challenges:

2.6.1.1 Users' acceptance of EHR system

The EHR process entails a very extensive and time consuming process if system in place is not well structured and still involve paper based process; hence, at times health workers end up going back to the old processes if the system is no well instilled (Weeks, 2013). Sampled health workers by system (Moomba, 2017) indicated that the use of EHR system increases their workload because they had to consult face to face with patients, record information on the file and finally enter it on the system. In the study by Wright et al., (2017), health workers disclosed that they were not involved in the selection and implementation discussions concerning the EHR system they operating. The authors also revealed that if health workers are not consulted when the new system is designed, that increases the work load as technology do not fit in their workflow process and therefore results to change resistance. Similarly, health employees' readiness in utilizing the electronic health records system is grounded on level of computer knowledge, hence reviewing the level of computer literacy prior to reinforcing users to accept the system is important (Terry et al., 2008). Furthermore, dedicating time for training is significant for organisations to escape the users' acceptance challenge as difficulties likely experienced when learning to utilise the EHR system while rendering services to patients on a busy working day (Terry et al., 2008).

2.6.1.2 Change resistance

Change resistant is due to deficiency of communication, lack of proper communication and integration, if health professional does not feel as part of change or lack adequate support in implementing change usually they resist change. This therefore results from lack of knowledge, skills or experience when utilizing the technology in place (Erasmus & Van Der Walt, 2015). Marutha and Ngulube (2012) mentioned that unanticipated challenges may be encountered in EHR implementation due to change resistance by health employees, consequential from lack of management support, lack of general training in records management or ineffective training and skill develop of employee to support the new technology system. Shonhe (2017, p. 20) equally indicated that without managing change process, people in the organisation are likely to resist change and the innovations results in implementation tragedy that is ineffective. For example the study conducted by Weeks (2014, pp.115-116) indicated nurses, administrators and physicians in some clinics in Pretoria commonly view capturing of patient's information utilizing EHR system as additional effort and time consuming with no benefit compared to paper based system.

2.6.1.3 Lack of interoperability

In year 2013, the CSIR and NDoH reported that in forty two (42) dissimilar HIS systems that support patient administration and healthcare in South Africa, only seven (7) were functioning in five (5) or more provinces, and these five were for monitoring and evaluation; while two apprehensive with healthcare. This is one of the concerns underscored by the National eHealth Strategy of South Africa (2012/2017) as the large number of different systems has no interoperability or any link of communication. The insufficient integration between different EHR systems was identified as a challenge facing the EHR system implementation process, as it becomes difficult to use the system for patient-centric care and for communication between health personnel (Wright et al., 2017, p.56). Furthermore, lack of interoperability leads to obsolete technology as influenced by failure to keep up with technology developments that therefore leads to poor productivity and inaccessibility of records (Shonhe, 2017, p.25).

2.6.1.4 Lack of ICT infrastructure

Insufficient ICT infrastructure to support the HIS system were also contributing challenges that hinder the EHR implementation and change process. Wright et al. (2017) examined current operational systems in electronic health information systems in South Africa the study pointed

out that, while there is eHealth Strategy in place there is no evidence of the national patient index enterprise that upkeep the national public health system. The lack of technology equipment and consistent internet connectivity play a major role in the imbalanced of the ICT infrastructure (Wright et al., 2017).

2.6.1.5 Lack of basic IT skills

The hospital is regarded as a diverse health environment offering different special health services, which therefore lead to different needs of information technology skills. In the latest review in South African public health sector, it is indicated that insufficient necessary ICT skills among health personnel to establish and maintain health information systems were part of the major challenges contributing in the implementation and operation of HER systems (Katurura & Cilliers, 2018, p.2). The authors further elaborate that scarcity of health informatics specialists in the public sector is also an issue hindering progress. Farusa and Coleman (2018) pinpointed that doctors with knowledge and skills to compliment the EHR system appreciate the benefit of working using as they have necessary skills.

2.6.1.6 Financial implications

The cost of EHR implementation is one of the most frequently identified factors that limits EHR adoption (Odekunle et al., 2017). The financial implications is indicated to have a negative effect on the EHR system comprising the start-up cost, the cost of owning the system and cost of training (Thomas, 2016, p.78). Similarly, additional costs are incurred through regular system upgrades, and ongoing maintenance creates an environment where physicians and hospitals are dis-incentivized to add an EHR system to operations (Su et al.,2006). Furthermore, the negligence of change management in the execution of EHR systems may also cost the hospitals.

2.6.1.7 Lack of staff productivity due to poor management of records.

Deficiency of effective system for tracking and indexing of files results in inadequate records keeping practice (Luthuli, 2017). This is noticeable from how clerks and record managers waste a lot of time looking for misfiled or missing records due to poor paper records management system, which is not favourable to the hospitals operation and results to lack of staff productivity (Marutha, 2011, p. 43). In addition, poor record keeping undermines accountability and transparency of healthcare provision (Luthuli, 2017).

Numerous studies recommend health information technology as a solution to tackle the above mentioned challenges thus to improve healthcare services in supporting hospitals management, with hope to ensure efficiency record keeping and support quality healthcare service delivery. Boonstra et al. (2014) argued that implementing EHR system is a complex matter consisting of wide range organisational practical factors; which therefore requires the involvement of all divisions' in the health organisation. However, implementation of EHR is more multidimensional than interchanging manual to electronic records management or data capturing of patient information.

2.8 MONITORING AND EVALUATING THE IMPACT OF EHR SYTEM IN HOSPITALS

The EHR system monitoring and evaluation is considered to be one the most essential aspects of assessing impact of utilizing technology in the health sector. One of objectives of the study is to examine how hospitals monitor and evaluate EHR system implementation and operation. The World Health Organisation (2018) defined monitoring as process of collecting data envisioned to measure progress of organisational performance or project executed. Monitoring and evaluation it ensures project plan implementation in order to attain positive results with the aim to improve efficiency and provide useful basis for evaluating which consist of systematic methods or tools used for assessing whether the project implemented is operative or not (World Health Organisation, 2018). Therefore, evaluation helps health organisations understand why certain results are not attainable and restructure if needed, in order to achieve desired outcomes (LeMay, 2010).

One of the principles of the National eHealth Strategy of South Africa (2012-2017, p.28) is to "…constantly evaluate eHealth initiatives and measure improvements in health outcomes in order to build an evidence base that demonstrates the benefit over time of eHealth and guides line planning and decision making". Meanwhile, this derives from numerous past eHealth initiatives including the EHR system in different provinces that have been unproductive and ineffective due to inadequate planning or lack of reliability sponsorship or funding and management structures.

In the context of the health organisation, monitoring is often utilised as an indicator to track and measure changes overtime, in order to manage project implementation (LeMay, 2010). Similarly, monitoring focuses on the on-going implementation, hence, evaluation provides an

opportunity for continuous learning from experience and opportunity to improve if necessary (LeMay, 2010). The Health Design Authority (2012) highlighted EHR monitoring and evaluation tools with a purpose to provide clear understanding on the tools available to assess EHR system capability within the health organisation. The tools include the following:

- **Peer review:** Fundamental exchange of interrelated information between health organisations entails benchmarking capabilities. This tools are limited to the knowledge associated with chosen health organisation
- **External audit:** It involves assigning a well-established with strong health professionals with proven records of offering EMR evaluating or auditing services. Although this evaluation tool is associated with high cost, it can tailor the organisation to the right strategic direction with results of improvements presented.
- **Self-Assessment:** Consist of the health organisation creating impact study survey and assigning internal project team to assess the current state of the organisation and forecast the future vision state, set goals and plan to achieve them.
- **Literature review:** It provides published work relating to the experiences or trending topic of the EMR system in different health organisations national and international.

Currently, there is limited literature on EHR system monitoring and evaluation; no strategy or tools officialised in South Africa to guide health organisations in assessing electronic health records systems. Katsande (2014, p.73) specified "…healthcare impacts were measured in terms of the effects of EMR documentation, patient's privacy, communication healthcare delivery and patient care".

Additionally, efficacious health strategy necessitates monitoring technology use, behaviour of users and making improvements analytics based on the results obtained (Stravers, 2015). According to Su et al. (2006, p. 154), evaluating the performance of EHR system is important, however challenging. Recent literature similarly indicates that there is no customary method for correlating effective EHR system as different health organisation have inimitable organisational structure, workflow processes, health employee's expectations highly influence the manner in which the EHR system is utilised within the organisation (Green Health Way, 2018).

Importantly, EHR system implementation is a long constant process, which needs on going evaluation and commitment of users to measure favourable or unfavourable EHR impact, this therefore will assist in identifying the gaps or challenges hindering the adoption progress.

Thomas (2016) indicated that post implementation is a phase of assessing and modifying the system is necessary. The author further stated that frequent monitoring and reporting allows implementers to know if any adjustments on the system are necessary. Another study in South Africa by Erasmus and Van Der Walt (2015) established that patient waiting time could be used as success indicator when evaluating the EHR system.

To Stravers (2015), reviewing EHR system includes it is usage and identification of time spent by personnel when searching for information, information load printed and replication of physical information. Furthermore, Su et al. (2006) asserted that advancing accuracy of patient documentation and efficiency in communiqué among health workers should be merged in any EHR system evaluation. The author elaborated that health information technology evaluation contemplate interaction among people, technology and environment.

The study by Cherry and Carpenter (2011) evaluated effectiveness of electronic medical records system in a long term healthcare facility by means of work process analysed through direct observation, and recording of steps followed by nurses when they carried their daily tasks. The study employed detailed flow chart with every step to capture work observed performed by nurses. The flow chart provided exceptional and precise technique of assessing the effect EMR system have on the workflow.

Similarly, Tubaishat (2017) evaluated the success of EHR system based on nurse's perceptions on the quality of the system, assessing the manner in which they use the records in the system, and the general level of satisfaction with EHR system. The study discovered that nurses positively support the operation of the system and perceive it with high quality and contentment; consequently, the findings reassure success of the HER implementation.

Berhe et al. (2017) also evaluated electronic medical records in Ethopia Ayeder Referral Hospital based on users' viewpoint with the aim to obtain results on the effectiveness of system executions. The study used four sub-dimension of users' satisfaction: context, usefulness, ease to learn, and ease to learn to evaluate the utility of the system. The study concluded that effectiveness rate shown to be very high and more than half of the participants were satisfied with using the system, therefore the implementation was perceived successful. Although it is indicated that there should be more computers in all hospital sites and strong support for users, and continuous training to advance success usage of the system.

Martha-Acquah (2015, p.109) mentioned the following outcomes in Effia Nkwata Regional Hospital Ghana, as measure to ensure sustainability of the EHR system:

- The hospital needs to add more staff to strengthen the IT department as the number is sternly insufficient.
- The need to increase power supply to improve long-term sustainability of the system as it is the challenge for many developing countries.
- The primary healthcare givers, doctors and nurses must be involved in the usage of the system as measure to address encounters arising from unreadable of their handwriting as it increases workload for oth

Literature indicates that different hospitals monitor and evaluate the impact of EHR systems using compatible evaluation tools based on the health services they offer, there is no notable existing standard method; therefore, Boonstra and Broekhuis (2010) indicated that rapidity and in-depth impact of the system may be enriched by the way it is executed. The motive driving the implementation, user satisfaction and time spent retrieving on the system is used as variables to measure the effect of EHR systems in hospitals.

2.9 CHANGE MANAGEMENT INTHE IMPLEMENTATION AND USE OF EHR SYSTEM IN SOUTH AFRICA AND OTHER COUNTRIES

There are number of studies in South Africa that have examined the implementation and use of EHR system in different health care institutions. Like many other countries, South Africa has also adopted and implemented EHR system to improve the health sector service delivery (Yogeswaran & Wright, 2016, p. 369). The implementation of EHR system in South Africa is still progressing due to limited literature and resources (Thomas, 2016). Therefore, the adoption of EHR system in South Africa can be described as stagnant in the pilot phase (Thomas, 2016, p.399). Earlier study conducted by O'Mahony (2009) on implementing electronic medical records system in rural areas in general practice indicated that the adoption of EMR is the fundamental catalyst for change in the medical practice. However, the current study uses the EHR interchangeably with EMR. Many users identified that the system selected was standing apart from the local environment, which therefore instigated hesitation; change resistance and lessened productivity in clinicians (O'Mahony, 2009). The study indicated that development of an EHR system was the easiest part, however the operational issues are challenging. The study settled that it is very expensive to change to the EHR system.

From Yogeswaran and Wright (2010), the focused was on the EHR implementation success possibilities in South Africa, as the country has already made endeavours to adopt EHR in the

health sector. The study was aimed to demonstrate a method to increase chances of success in envisioned national implementation project in South Africa. The authors mentioned that an assessment tool was established to measure the status of readiness in South African health institutions in implementing EHR based on Balance Score Card (BSC) matrix by Kaplan and Norton and the subsequent variant model developed by Prott, which in simple terms was developed to be used as strategic framework. Another framework, the Critical Success Factor (CSF) scorecard measured the state of readiness and was found to be relevant and appropriate; however inclusion of change management was seen as a necessity. The author further indicated that the development process of the assessment toolkit included a validation process; a panel of international and national experts who reviewed the instrument related to its theoretical supporting content and format. Yogeswaran and Wright (2010) asserted that timing of the development of the toolkit was suitable in the context of South African EHR policy and implementation process. The study concluded that the tool kit developed to evaluate the state of readiness in South Africa has potential of constructive effect to assist health organisations towards a successful EHR implementation path.

Weeks (2014) examined the implementation of EHR in Pretoria clinics, South Africa. The study aimed to determine difficulties stumble upon in the execution of an EHR system and the manner in which they could be resolved. Weeks (2014) indicated that transformation process was challenged by well instilled paper based culture that existed. Weeks (2014) further stated that technologist involved in the implementation of the health system confirmed that technology adopted was not a problem; however, changing organisational culture and training health workers was far more challenging. Therefore, this is one of the contributing concerns challenging the operation of EHR system and might result from imprecise change management approach. The author opined that human socio technological factor needs to be vigorously managed as part of the change management process (Weeks, 2014).

The analysis by Thomas (2016) on the implementation of electronic health records in Pretoria clinics pointed that the utilization of EHR system created high level of change during *pre* and *post* adoption. The researcher aimed at understanding the perspective of users and subject expert in order to propose best practice for execution of EHR system. The study specified that benefits of using EHR systems get to be visible accomplished when the implementation done appropriately. The study found that in the pre-implementation phase, two elements of change management approach are essential which included infrastructure, hardware and systems, and

developing ownership from the user. The study concluded that it is important to re-arrange change management model in order to rationalize the adoption of EHR in primary healthcare amenities. The study also concluded that success of EHR is dependent on the complete adoption and change proficiency of managers within health amenities.

In a related study, Erasmus and Van Der Walt (2015) examined challenges faced by healthcare professionals in accepting the EMR system in two medical institutions in South Africa. The study anticipated to identify the effectiveness of utilizing EHR system based on the perceived efficiency of health professionals as related to their buy in and acceptance of the system. The authors tested change management as scientific field of study that can be utilised to enable the changeover process from paper based to EMR system. The first health institution (A) was progressively implementing the new system, and second institution (B) was in the stage of deployment. The two sampled health institutions have been found to be immensely different operating conditions. Both institutions have to overcome the challenge of insufficient ICT skills in their staff in order to influence the use of the EHR system for everyone's benefit. The study alluded that the success of the system is based on the patient waiting time to be attended.

Katsinde (2014) examined perception of health workers in Tygerberg Hospital Cape Town, South Africa towards electronic health records system. In addition, the perception of the impact of the system on healthcare service delivery and other related results of utilizing the EHR system including the intention to continue using the system. The study indicated that perception on the healthcare workers using the system was positively linked with job satisfaction. The study settled that healthcare organisation should be enhanced to comprehend health employees concerning the system and how those come to affect their behaviour.

Similar to most developing countries, Nigeria also executes the use of ICT in the health sector. Taiwo et al. (2016) conducted a study in Nigeria on developing the usability framework in EHR. Literature reveals that the use EHR rate in Nigeria has been utilised in a high rate, although the adoption of the system is very slow. Noticeably, the country's health sectors still use the traditional paper-based method of keeping records of patients (Taiwo et al., 2016). The study also indicated that usability framework was anticipated to be inclusive of learnability, efficiency, memorability, usability, usefulness and satisfaction as the qualities or features that create EHR system adoptable and operational for Nigerian healthcare sector. However, the study recommended that every EHR system intended for implementation should be flexible,

and the information should be presented in a way that signify the way that it represent the expectations and preceding knowledge of intended operators. However, the study failed to determine the role of change management in the usability framework in EHR but highly emphasised the usability framework as tool used to achieve goals in the working environment by executing certain tasks.

In Ghana, Acquash-Swanzy (2016) evaluated Effia Nkwata Regional Hospital on the groundwork made prior to the systems introduction as well as factors hindering or advancing the usage of electronic health records system and user satisfaction among health employees. The researcher further examined the impact of the system in health service delivery identifying benefits and challenges delaying the system; and indicated that the hospital had collated the qualified team who had strong understanding of the system, who were equipped and educated about the system before it was executed in the hospital. Although, there is enormous success of using the system in the hospital, one of the shortfalls indicated was the exclusion of users in the decision-making and system preparation. The study concluded that sustainability measures needs to be in pace place prior to the implementation.

Akanbi et al. (2012) similarly examined factors affecting the adoption and implement of EHR in Sub-Saharan Africa, establish that to implement and operate the HIT systems is beyond financial means for most health service providers. The research further elaborated that the use of EHR system has been recognised as the most essential part of improving health service delivery; however, very few African countries have human capital and appropriate skills to advance health infrastructure and software packages including sustainability and maintenance, as they are costly. Additionally, the researchers mentioned that although the EHR system is beneficial to many hospitals, EHR system implementation is hardly prioritised due to high cost of procuring the health information system. The researchers concluded that lack of financial incentives for adoption, expensive maintenance and sustainability cost, poor electricity supply, insufficient internet connectivity, short computer skills are some of the contributing factors to low adoption of EHR in Sub- Saharan Africa. The researchers alluded that early involvement of stakeholders have the greater possibility of preventing change resistance to users; however, the study has failed to consider management of change as the solution to challenges facing the health sector in Sub-Saharan Africa.

The study by Waithera et al. (2017) in Kenya on electronic medical records healthcare service delivery aimed at reviewing, understanding the impact and operational use of EMR in the Kisii

Teaching and Referral Private Hospital. The researchers revealed that there is inadequate knowledge on the perception of health care providers who utilises the system. The study specified that there has been improvement in privacy and security on patient's information due to users' accounts and password provided by the system. The study further indicated an increase in work productivity of health providers using the system. In this hospital, the EHR system successfully supports order entry and prescribing, exchange of electronic health information; although there are benefits of utilizing EMR the study noted that the system operated did not support. These include clinical duties, as there are modules in the system that were not accessible and functioning due to insufficient funds to maintain the system. The study further reported shortage of staff in ICT division who supposed to be accountable and maintain system.

In Zambia, Moomba (2017) explored healthcare workers' perceptions and experiences in the use of the EHR system in two Health Centres. The study also focused on factors determining workers acceptability of the system. The author found efficacy in offering patient care, patient waiting time, constancy of care and patient monitoring impact the execution and operation of EHR system. The study in addition indicated that full usage of the EMR is still a challenge among health workers in Zambia. The study commended that different stakeholders including health employees in hospital and district management should work together as a team to change, improve, and promote the use of the system in place in both health centres.

In the United State of America for instance, new laws were approved to incentivize the successful implementation and use of electronic health records system in health care institutions (Stanberry, 2011). Earlier study conducted by Carayon et al. (2009) at University of Wiscon, practice clinic, and family medicine residency in the United State of America, focused on the view point of the clinical staff in the implementation of EHR system. Specifically, employees experienced conversion in workflow and skills applied in doing their daily duties. They indicated more time consumed using computer instead of personal assessing the patient and high volume of workload due to implementation and use of EHR system. The study highlighted the need to consider EHR implementation as major social-change. It also emphasised that when health organisation make some decisions to acquire principle of project management, technological change need to be executed to indorse prompt and effectual change responsibility by end users.

Succinctly, the electronic health records systems utilised in the developing country are commonly in small projects and sponsored by organisations in developed countries (O'Mahony, 2009). Yogeswaran and Wright (2010) argued that health organisations should have transparent developed strategy to manage change in order to have accepted change process in place. The authors further elaborate that change management strategy should consist of approaches to achieve anticipated change in people and organisation. This implies that the application and utilization of EHR system is not only about practical endeavour but also about organisational adjustments. This attests that change management is the most fundamental element to customize and ensure effective use of the system.

2.10 SUMMARY

The intention of this chapter was to review relevant literature to the study. This chapter discussed the theoretical framework applied to the study, which is leading change model in integration with TAM model. The chapter comprehensively delineated the conceptual framework of change management in electronic health records including the importance of managing change in the context of records management. The literature review established factors facilitating the adoption of EHR system in most hospitals in many parts of the world including South Africa, not limited to lack of storage, misfiling long queues etc. This chapter also explicated benefits of utilising the system, despite that there is no notable evidence of standardised sustainability, monitoring and evaluation strategy for these EHR systems in South African hospitals. The next chapter focuses on the research methodology utilised in the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The previous chapter reviewed literature on change management in the implementation of electronic health records in South African hospitals and abroad. This chapter discuss research methodology that was utilised in this study. Research methodology is asset of processes and approaches utilised to conduct research Creswell (2012). Rajasekar et al. (2013) outlined research as rational and methodical search to discover new and valuable information on a specific topic. The authors believed that the objectives of research is not limited to validating and testing significant fact; to create new systematic tools;, to solve existing social problems in our communities; to identify the cause and effect in different context or variables but also that research methodology considers and elucidates the rationality behind research methods and techniques. Neumann (2011, p.26) elaborated that research methodology involves detailed methods for selecting cases; measuring and perceiving facet of social life; gatherings and adjudicating data; and analysing the data and reporting outcomes. According to Welman et al. (2005), research methodology is the technique that involves attaining knowledge by means of different methods and procedures. This further suggests research methodology as a way to scientifically solve the research problem, and the detailed procedure of how the research is conducted towards achieving the ultimate aim of the study.

Chapter three discusses the research paradigm, research approach, research design population, sampling, data collection instruments, procedure, validity and reliability, data analysis, and ethical consideration. It also entails the summary of how data were analysed and presented.

3.2 RESEARCH PARADIGM

Research paradigm is the way of describing a worldview that is informed by philosophical assumption known as ontology, and ways of knowing the nature of reality, which is epistemology (Creswell, 2014; Chilisa & Kawulich, 2012; Ngulube, 2015). According to Patton (2002), human perceptions have influence on the nature of reality. The two main branches of philosophy are different. According to Chalmers (2002), ontology is the study of existing facts. It is concerning the overall nature of things that exist. Similarly, ontology considers the nature of social entities, as being objective or subjective (Bryman 2012, p.32).

On the other hand, epistemology is the way of knowing the nature of reality (Patton, 2002). It constitutes knowledge and the ways of knowing. Ngulube, (2015) defined epistemology as what constitutes knowledge and the ways of knowing. Weiner (2013) confirmed that epistemology is the research method of how we know things. Epistemology emphasises the connection between the researcher and the ontology (Dudovskiy, 2016). Epistemology deliberates the need for answering the question of "what is or should be viewed as acceptable knowledge in a discipline (Bryman, 2012; & Ngulube, 2015). Epistemology can be either positivism or interpretivism (Dudovskiy, 2016; Kelly, 2016, p.22). The researchers elaborated that positivism is proper in quantitative research and interpretivism in qualitative. According to Antwi and Hamza (2015, p.22) the mixed method is grounded on the philosophy of pragmatism. The pragmatism paradigm compliments both qualitative and quantitative research questions in the study (Creswell, 2003, p.18).

The current study adopted pragmatism to assess user's attitude towards the EHR systems and evaluate change management in both public and private hospitals in the utilisation of the EHR systems. Pragmatism offers strong basis on research questions, communication and meaning (Baker, 2016, p.33). Ngulube (2015) settles that pluralism ontology is appropriate for the mixed method study. Therefore, pragmatic epistemology was appropriate as it disclosed unabridged facts on both qualitative and quantitative elements in the current study. The study also determined tools used by hospital management to reinforce change and sustain results in the implementation of EHR system. In the current study, the researcher comparatively assessed change management perspective in EHR system implementation and operation in public and private hospitals and determined the effect of change management in the use of the systems in rendering health services in both hospitals.

3.3 RESEARCH APPROACH

The main research approaches are qualitative, quantitative and mixed method. The qualitative research approach is defined as exploring and understanding the meaning individuals or groups assigns to a social or human problem; quantitative approach means testing objective theories by examining the relationship among variables; and the mixed method incorporates elements of both qualitative and quantitative (Creswell, 2007). On the other hand, Baker, (2016, p. 321) views the mixed method as a type of inquiry that is philosophically grounded where an intentional mixture of both qualitative and quantitative is utilized in the research study. In other words, qualitative approach involves the collection of data in the form of words, and

quantitative approach collects data in form of numbers (Mahmud, 2012, p.39). Both quantitative and qualitative approaches were used concurrently to achieve the objectives of the study. Therefore, the study deployed the mixed method approaches it was suitable to measures users' attitude towards the EHR system and assess change management its implementation and operation. The mixed method approach was also appropriate to uncover and assess change management effects in the implementation and use of electronic health records in the public and private hospitals.

Furthermore, it is important to underscore the fact that the research approach can be inductive, deductive or abductive. The inductive approach is associated with qualitative methods; whilst the deductive approach is perceived to be related to quantitative method. Accordingly, as argued by Dubois and Gadde (2002, p.559), when one approach is inadequate to respond to the research question, the abductive approach is an alternative as it compliments both approaches is therefore associated with the mixed method research. Abductive approach was useful in the current study in that it provided in-depth validation of the two sets of quantitative and qualitative data.

3.4 RESEARCH DESIGN

Research design comprehensively determines methodology used during the research study (Bailey, 2018, p.9). A research design is utilised to provide guidelines about low-cost, simply and cautiously manner in which data would be collected and analysed to fulfil the purpose of the research (Marutha 2011, p. 77). It assists the researcher to articulate overall strategy for connecting the conceptual of the research problem, and it allows the researcher to design instruments for data collection and analysing measures. The study comparatively examined dissimilar group of hospitals employees (health providers, hospital management and administration) concerning change management in the implementation and operation of electronic health records systems in two hospitals a public and private.

The study utilised concurrently the cross sectional survey and the qualitative case study designs to compare the public and private hospital on the change management in the implementation of electronic health records systems. The survey approach involves collection of information from sample of population through questionnaires and interviews (Neuman, 2014: pg 48 and Check & Schutt, 2012). The study utilised survey method to measure users' attitude, performance and describe behavioural pattern towards EHR system. The survey method

allowed the researcher to ask similar set of questions to a certain number of individuals (Neuman, 2014, p. 49). A case study gives an in-depth understanding of factors that influence events, changes and growth within an organisation (Luthuli, 2017). The case study research design allowed the researcher to obtain in-depth information on the investigated subject (Crowe, 2011) on how stakeholder managed change management in cases of the two hospitals.

3.5 STUDY POPULATION

The population for this study consists of three groups or strata. The first group consists record management personnel, patient admins, and filing or ward clerk who deals mainly with hospital administration. The second group comprises doctors and nurses, who render healthcare services to patients. The study referred the first and second group as users of electronic health record system. The third group involves managers who are responsible for the hospital tactical processes, managing change and decision-making.

3.6 SAMPLE SIZE

Sample size is the number of individuals from whom the researcher will obtain required information (Kumar, 2014). The desired size of the population does not only depend on the population but also on the alteration of variables. However, the size of the population is from the sample being targeted (Welmar & Kruger, 2001). The study used convenience sampling whereby the participants were selected based on their availability and accessibility (Elfil & Negida, 2017). Therefore, nurses, doctors, ward and filing clerks were selected based on their availability from different units. Including receptionists and patient administrators who were in their respective working stations in the outpatient department.

For each department, 2 nurses and 2 doctors were conveniently selected out of 24 departments in public and private hospital, resulted into a total of 48 nurses and 48 doctors in the public hospital in each category, while for each of the 14 department 3 nurses and 2 doctors were conveniently selected totalling to 42 nurses and 28 doctors. In the public hospital, 10 patient administrators, 10 ward clerks, 1 records management personnel and 8 managers were interviewed based on their availability, therefore, the sample size for the public hospital was 121. In the private hospital, 6 management staff were interviewed, 24 doctors, 42 nurses, 10 patient administrator, 3 receptionists, 8 file or ward and 1 records management personnel were selected to make a total sample of 94 members.

Table 3.1 demonstrates the sample distribution for the public and private hospitals.

Table 3.1: Public Hospital

Participants	**Total Population**	**Sample size**
Doctors	48	44
Nurses	48	48
Patient's administrators	10	10
Record management personnel	1	1
Ward Clerks	10	10
Managers	8	8
Total	**125**	**121**

Table 3.2: Private Hospital

Participants	**Total Population**	**Sample size**
Doctors	28	24
Nurse	42	42
Patient's administrators	10	10
Receptionists	3	3
File or Ward Clerks	8	8
Record management personnel's	1	1
Records management managers	6	6
Total	**98**	**94**

3.7 DATA COLLECTION INSTRUMENTS

This section explain in details the data collection instrument that were utilised to collect data. Polonsky and Waller (2011) emphasize on the importance to choose data collection instruments that provide appropriate answers to the research questions. Data collection instrument is selected based on the nature of the study. This study collected quantitative and qualitative data concurrently in both public and private hospitals. For purpose of this study, the researcher utilised the flowing data gathering methods:

3.7.1 Questionnaires

The researcher used questionnaire method to collect data from users of EHR system in both public and private hospitals. According to Creswell (2008, pg12) questionnaires are suitable for survey research. Questionnaires are a convenient way of collecting useful and comparable data from large number of individuals (Mathers et al., 2009 p.19). One set of questionnaires (Appendix 4) was designed to gather data from two different groups. First group was nurses

and doctors; second group was patient's administrators, receptionist or ward clerks or record management personnel. The quantitative data was collected with the use of open and closed ended questionnaire. The researcher collected the distributed questionnaires within a period of one weeks for each department.

3.7.2 Interviews

An interview is typically a face-to-face conversation between a researcher and a participant based on the particular topic being studied (Creswell, 2012). Interviews are either structured, semi-structured or unstructured (Pollock, 2019). In the structured interviews, closed ended questions are prepared in advance. All interviewed participants are asked the same questions in the same order (Pollock, 2019). Unstructured interview are not prepared in advance meaning different candidates are asked different questions. Semi-structured are those in-depth interviews where the respondents have to answer open-ended questions (Jamshed,2014). In the semi-structured interview, the questions are constructed based on themes or topics that need to be explored by the interviewer (Jamshed, 2014). In this study, semi-structured interview guide was used to cover intended scope and explore knowledge about management of change in electronic health records in both hospitals (Appendix 3).

The interview was in-depth qualitative as the researcher was looking for rich and detailed information about management of change in EHR implementation and operation. Interviews conducted in the public hospital with the management team including technology manager, assistance manager, systems manager, nursing manager, case manager, information technology manager and operation manager. In the private hospital, records management manager, training and skill development manager, patient service manager, information technology manager, monitoring and evaluation manager including hospital manager were also interviewed. Semi-structured interviews were conducted in order to obtain comprehensive response and understanding of EHR impact on hospital tactical processes.

3.7.3 Direct Observation

The researcher used direct observation for qualitative data gathering. In a direct observation, the researcher observe sampled situations or people rather than taking part (Trochim, 2020). This technique was used to perceive and experience EHR workflow and mainly to identify how it positively or negatively affects healthcare service delivery. The observation

checklist included workflow processes in EHR; assess system user friendliness; coding functions for data capturing, directive operational support to assist users (e.g. help button); staff productivity in using EHR and end-users' participation during health service transaction (Appendix 5). However, additional comments during observation were also recorded on the checklist. The observation took one week in each hospital, and the researcher recorded obtained data on the logbook, which helped the researcher to record steps and details of each observatory procedure. Furthermore, the researcher substantiated information collected on observation through interviews and questionnaires, on the basis that participants directly or indirectly interrelate with the electronic health system.

3.8 VALIDATION OF DATA COLLECTION INSTRUMENTS

Olsen (2012) described validity and reliability as the most important aspect of survey research. Reliability is a research instrument that provides similar results when utilised repeatedly under similar conditions (Kumar 2014, p.380). The author explained validity as the ability of an instrument to measure what it is designed to measure. (Kumar, 2014, p.386) refers to validity as a situation where the findings of the study are in accordance with what the research is trying to find out. Babbie (2007, pp.256-257) mentioned that in research, data collection tools mainly questionnaires requires the researcher to pre-test them before collecting data in order to correct faults or content that may be difficult for participants to understand. The researcher made use of records management subject and research experts at University of Zululand to critique whether constructed semi-structured interview questions, observational methods and questionnaires developed were satisfactorily and relevant to the subject prior before it was pre-tested on the targeted participants. The researcher utilised face validity to determine whether instruments developed were intended to measure what is expected. Pajo (2018,p.127) asserted that face validity means that the researcher has decided to classify the measurement instrument or tool as an accurate measure of the construct in question. Therefore, data collection instruments was pre-tested and piloted through visit to the public and private hospital to using 5 participants from each hospital. In essence, face validity refer to subjective assessment of the validity of a measurement instrument made by the researcher (Pajo, 2018, p.127).

3.8.1 Content validity

Pajo (2018, p.127) referred to content validity as the extent or level of measurement for tools to capture all the aspect of the construct that being tested or measured. Creswell (2014) defined content validity defined as the degree in which all items in an instrument represent all the facets of the variable being measured (Creswell, 2014). According to Kumar (2014,p.214), content validity is judged on the basis that an instrument is measuring what is supposed to measure based upon the logic link between the question and objectives of the study. The author further explained that content validity is judged based on the extent of which statements or questions represent the issue they supposed to measure (Kumar 2014, p.214). For this study, questions about change management EHR and user awareness about the system were used to determine change management in in the implementation and operation of EHR.

3.10 DATA COLLECTION PROCEDURE

Creswell (2014, p.189) stated that explanations about the role of the researcher set the stage of issues involved in data collection. The data collection process commenced by attaining ethical certificate from University of Zululand ethical committee after the research proposal have passed through all the necessary steps of compliance. The ethical clearance allowed the researcher to continue with proposed study and began requesting permission to conduct research in two targeted public and private hospitals.

As mentioned earlier, the public hospital reports to the KwaZulu-Natal provincial Department of Health. The researcher applied for the provincial ethical clearance using the National Health Research Database website. The National Health Database website serves as a repository for health related research used by the National Department of Health for monitoring and managing research for both national and provincial research. The online application process included the supporting letter from the hospital, a short proposal outlining the study and ethical clearance issued by University of Zululand. The online application was processed by the provincial Department of Health. After four weeks of evaluation, the permission letter was issued and the researcher started collecting data at the public hospital. Meanwhile, the private hospital had separate processes when it comes to non-clinical research related matters. The permission to conduct research was not granted by the Department of Health as the hospital is privately owned and operated by hospital group. The researcher sent letter of request, short proposal outlining the study and University of Zululand ethical clearance certificate to the hospital group ethical committee. The application for a permission letter was evaluated, and six months later, the permission to collect data was issued.

Data collection in a hospital setting can be a daunting task, however the researcher managed to collect more than 50 percent data from both public and private hospitals. The researcher distributed questionnaires to doctors in their respective departments based on their availability and on appointments and later collected questionnaire on a day given by them. However, there were instances where the researcher had to follow them around in places like cafeteria for them to respond to questionnaires during their lunch or tea break. It is important to emphasise that due to the nature of nurse's work, the researcher had to work closely with sisters in charge in all different departments to schedule appropriate time to distribute questionnaires based on their availability. The questionnaires were distributed on the lesser busy days during the week, when departments had no patients referred from other hospitals. Furthermore, nurses and ward clerks available took turns to fill the questionnaires. The researcher remained present during the process to give clarity to participants who did not understand terminology of change management and electronic health records systems as some of them were slightly confused.

Distributing questionnaires to patient administrators was done through the Admission Managers, and due to their busy nature of work, the manager scheduled time for the researcher to distribute questionnaires. This process was fast because patient administrators filled questionnaires while the researcher was waiting. Therefore, 10 patient admins responded well. In addition, the interviews with the hospital management werescheduled based on their availability and conducted successfully. All hospital management employees werebased in one building called the Management Building and were mostly located in the same floor. All interviews were recorded with the interviewees consent and notes werealso taken. Most interviews took an average time of 30 to 45 minutes, while the longest interview took an hour.

Furthermore, observation werealso done on the EHR user interface in order to understand how the system operates and how the various users interact with the system in their different respective duties. The researcher also had an insight of how the system islinked to all departments within the hospital. The private hospital operated differently compared to the public hospital. The questionnaires to nurses and ward clerks weredistributed through Unit Managers on appointments, these were later collected in a space of a week, and the response was exceptional. For patient administrators and receptionists, the supervisor in charged scheduled a day for administrators to take turns from their service counters to fill-in the questionnaires while the researcher waited for them and collected same day. The questionnaire for filing clerks were distributed with the assistance of the Patient Service Manager in charge of the filing process and the process was simple, and their response rate was good.

The challenging part of the selected private hospital was distributing questionnaires to doctors since they were located in different hospital buildings. They were also independent, and operated their own surgeries away from the hospital. In addition, they were normally present in the hospital premises based on appointments with their patients, and hardly around the hospital premises unless on a call for duty. The researcher attempted to distribute questionnaires; however, it was difficult to secure appointments. The researcher then had to create an electronic version questionnaire similar to the hard copy questionnaire and e-mailed it to doctors. With the assistance of the hospital management office, reminders for doctors to fill in the questionnaires were sent. Due to the above-mentioned reasons, the process was slow and time consuming, thus required the researcher to extend data collection period. Nevertheless, the researcher managed to obtain responses from the majority of the targeted doctors. As was the case with the public hospital, the interviews for private hospital management were scheduled based on their availability.

3.11 DATA ANALYSIS AND INTERPRETATION

Data analysis explains the procedure adopted to keep track of the research process (Pandya, 2012, p. 41). Data analysis consists of categorizing and summarizing data obtained to answer research questions (Kumar, 2005). Data analysis can be done in qualitatively or quantitatively (Marutha, 2011,p.91). The current study involved the analysis of both qualitative and quantitative data concurrently. Therefore, the study used both set data analysis technique, that is, qualitative and quantitative which was triangulated and interpreted in order to strengthen and present data collected. Triangulation increases data validation and credibility by cross verifying the information obtained. The quantitative method was utilised to analyse numerical data, while the qualitative method focused on raw data, description of events, or long precise quotation provided by participants (Pandya, 2012, p. 376). Data collected was summarised and interpreted in order to provide analysis through identification of themes and presentation of findings (Katuu, 2015).

This study adopted the concurrent triangulation, as qualitative and quantitative research data from both public and private hospital were gathered and analysed at once using Google Forms. The researcher opened the Google Form account to create a survey questionnaire and further generated bar graphs, pie charts and tables from Microsoft excel to present data and findings of the study. The web-based application called Google Forms is utilised to create forms for data collection purposes and educational related tasks. Google form was established and tested

in the United Kingdom for administrators training programme for self- assessment on the National Education Technology Standards for Administrators. It is a free survey administrative application that records participant's response in a Google spreadsheet within the Google document application and can later be downloaded as Microsoft Excel spreadsheet for further analysis. Descriptive statistics was used to describe frequencies and data presented in bar graphs and pie charts while the interviews and observations notes were thematically categorised and presented narratively.

3.12 ETHICAL CONSIDERATION

According to the University of Zululand (2016) ethics should embody respect of the rights of others who directly or indirectly affected by the research study. The University of Zululand ethical guidelines were followed by first obtaining ethical clearance certificate No. UZREC 171110-030 PGM 2018/512 (see Appendix 6) after the research proposal was evaluated and approved. The University of Zululand provided the researcher with ethical guidelines and policies for compliance. The ethical documentation provided by University of Zululand ensured that the researcher avoids plagiarism and protect confidentiality of participants. The study ensured inform consent was obtained from participants, consent form and covering letter were provided (see Appendix 1, 2).

For the public hospital, permission was obtained through the Department of Heath online based application process. The researcher had to upload all required documents and followed up on the application status. The Department of Health also sent application correspondence to the researcher sent via emails. The permission to conduct research at the public hospital was granted after the application was approved with clear indication on which office to report at, on first arrival (see Appendix 7). Meanwhile, in the private hospital, the application for permission was sent via email to the Hospital manager. The manager referred the researcher to the hospital ethical committee formed by the private hospital group based at head office in Johannesburg. Successively, the permission granted by the private hospital group (see Appendix 8).

General ethical protocols and procedure were applied and guided even during interviews; no respondents were not asked their personal information. The study complied and sufficiently met ethical consideration and rules by the University of Zululand, and thereby avoided plagiarism by citing all the sources used.

3.13 SUMMARY

This chapter covered research methodology of the study. Mixed method research was applied in the study. The study further justified the alignments of the method chosen for the study. Based on the research paradigm adopted, the study used pragmatic epistemology and pluralistic ontology. The researcher indicated and discussed, research approach, research design, study population and sampling method. This chapter further explains data collection instrument, data collection procedure, data analysis and interpretation. Ethical consideration was also discussed. The next chapter presents findings analysis of data.

CHAPTER FOUR

PRESENTATION AND ANALYSIS AND OF FINDINGS

4.1 INTRODUCTION

The previous chapter discussed the research methodology that was utilised in the study. It covered the methodological processes such as the research paradigm, research approach, study population and sampling methods used, data collection instruments utilised and ethical considerations. This chapter presents the study findings of the study. The findings of the study are based on the following research objectives:

a) To determine factors facilitating the adoption of EHR systems in public and private hospitals.
b) To assess changes experienced by hospitals due to EHR systems implementation.
c) To examine how hospitals monitor and evaluate the impact of EHR systems implementation.
d) To determine tools used by hospital management to reinforce change and sustain results in the implementation of EHR system.
e) To recommend change management strategy for electronic health records systems in public and private hospitals in the eThekwini Area.

According to Marshall and Rossman (1999, p. 150) data analysis is the process of bringing structure together and meaning to the mass of collected data. For more clarity, data analysis is the method of reviewing and interpreting data collected with an aim of determining constructive information that will later propose recommendations and conclusion to the problem stated in Chapter 1. Data for this study were collected utilising semi-structured questionnaires to determine changes experienced by doctors, nurses, patients administrators, record management personnel file and ward clerks using the EHR system and also assessed the level of acceptance of the system by the above mentioned hospitals employees. In addition, the observational checklist was used to evaluate how the EHR system work flow positively or negatively impact the hospitals health service delivery. In-depth interviews were also conducted with hospital management and records management personnel to obtain detailed information on the impact of tactical processes in managing changes instigated by the system in both hospitals, and to determine tools used by the hospital management to fortify change in the implementation of EHR systems and sustain the results.

4.2 RESPONSE RATE AND PARTICIPANTS' PROFILE

The total targeted population in both public and private hospitals was 215 as indicated in Table 4.1. Therefore, 215 copies of semi-structured questionnaires were distributed to nurses, doctors, receptionists, filing or ward clerks, record management personnel and patient administrators. Additionally, open-ended interviews were conducted with the hospital management. Out of 215 distributed questionnaires to both hospitals; 187 questionnaires were filled and returned, representing the overall total of 87 (76%). The respondents comprised of health workers rendering health care services directly to patients (nurses and doctors), hospital workers focusing on hospital administration processes (receptionists, filing or ward clerk, record personnel and patient administrators) and the management handling hospital tactical processes. All the respondents have directly or indirectly involved in the implementation and use of the EHR systems in both hospitals.

In comparison, the public hospital has a total of 107 out 121 EHR system users who responded, representing a response rate of 88.4%; whereas in the private hospital, a total of 80 participants responded out of the 94 participants, thus representing a response rate of 85.1%. Aina (2002:41) specified that in most surveys, it is challenging to achieve 100% response rate. Likewise in the current study, there were difficulties encountered that resulted to low response, particularly from doctors due to absence of free time at work. According to Bobbie and Mouton (2001, p. 261), the response rate of 50% may be considered satisfactory for analysis, while 60% is good and 70% is considered exceptional well. This therefore indicates that the response rate for this study may be rated excellent. Table 4.1 presents this information.

Table 4.1: Questionnaire response rate (n=187)

Types of Hospital	Questionnaires distributed	Doctor	Nurse	Receptionist	Filing or Ward Clerk	Records management personnel	Management	Patient administrators	Questionnaires not returned	Total
Public	121	31	48	0	10	0	8	10	14	107
Private	94	18	36	3	7	0	6	10	14	80
Total	215	49	84	3	17	0	14	20	28	187

The subsequent following sections present the finding of data collected as per themes derived based on the study objectives.

4.3 FACTORS FACILITATING THE ADOPTION OF EHR SYSTEMS IN PUBLIC AND PRIVATE HOPSITALS.

The first objective of the study was to determine factors facilitating the adoption of EHR systems in public and private hospitals. In the current study, it is revealed that the implementation of EHR system is driven by urgency or motive to overcome challenges facing records management in public and private health sector. Luthuli (2017), Katuu (2015), Pyrene (2015) and Marutha (2011) pointed out some common challenges experienced by hospitals in different provinces as a reason for implementing the electronic health records systems. The authors proposed the use of ICT to improve records management and service delivery in hospitals. Therefore understanding the urgency of implementing EHR system is an important aspect in the transition process as it balances consistence in the change management practice and keeps employees and organisation motivated towards positive outcome. This section is presented according to the following sub-themes namely:

- Sense of urgency to initiate, improve and upgrade EHR systems in public and private hospitals.
- Importance of change management in the adoption of health information systems in hospitals.
- Sharing vision of using EHR system in the implementation process.
- Involvement of users in the implementation of EHR system in hospitals.
- Support received by hospitals from the Department of Health in managing EHR system.

4.3.1 Sense of urgency to implement EHR systems in public and private hospitals

For any organisation, **c**hange is driven by the urgency to overcome obstacles, improves organisational processes, and advance service delivery. Likewise, in the public and private hospitals, the implementation of EHR systems is driven by various factors that result in hospitals improving health records management. In most cases, challenges in an organisation are highly experienced by people at operational whereas decisions on the matter of urgency is taken at management level. The study revealed that both public and private hospitals have challenges that foster the use EHR systems.

In that regard, the management of both public and private hospitals were asked about the factors that facilitate the implementation of EHR systems and if they realised the value and of purpose of using EHR systems. Furthermore, the study also sought to understand the motive driving EHR system transition and whether the management has a clear vision on this. Respondents (1, 3, 4, 5, 6, 7 and 8) from the public hospital had this to say in an interview regarding the value of the EHR:

> *"…The aim of facilitating the EHR system was for data sharing preventing duplication of patient files. The main aim of using the EHR system was for avoiding duplication of tests as other patient's window shop and waste state medical resources".*

Respondent (2) from the information technology department stated the value of the EHR system to the hospital that:

> *"… Inkosi Albert Luthuli Central Hospital is a biggest provincial referral hospital in KZN and has the state of art and a strong support system for most hospitals around the province… even outside, hence when it was first opened, it fully operated electronically for easy communication among health providers and also effective health service delivery as it serves various hospitals in the country".*

Respondent three from the management indicated how the system saved time thus:

> *"…The EHR system saves time, avoid duplication of tests, it is cost saving and also easily allow the hospital employees to do the patient administration more especial for referred patients from other hospitals as in most instances the health information of patient is on the system prior to patients being on the hospital".*

The response from the private hospital was the same as the in the public hospital. Management were of the view that the EHR systems help in limiting patient waiting time and minimises the loss of patient's files that is common challenge in most hospitals in South Africa.

The public hospital also indicated that their system consolidates patient history and can easily retrieve files for litigation related matters. The hospital management at the private hospital emphasized that health information systems is not used fully for records management. The private hospital merely uses the current system for admission purposes, capturing and keeping patient personal information, billing and stock control for pharmacy. In terms of health records, the hospital has electronic system in place for archiving purposes, however their health records are kept by the external service provider responsible for capturing, storing and retrieving files whenever the hospital request them. During interview respondents one, two, three, four, five and six from private hospital specified that:

"The adoption of EHR system is a matter of urgency for our hospital group, as we are living in the technology era. The hospital needs to be aligned with the latest trends of health information systems for records management in order to match the modern society and efficient service delivery. Moreover, the EHR system is perceived to be cost saving, accurate medium for data capturing, this can also result to health employees focusing more on patients than administration in between consultation. Our hospital group needs to consolidate the different system we currently using and create one electronic health record system with dissimilar modules for our employees to perform their duties and produce one health record".

On the other hand, different users were surveyed using questionnaires if they think there was any sense of urgency in the implementation of EHR systems in place in public and private hospital. The majority of respondents in both hospitals said there was urgency in the implementation of EHR systems. Thus, 38 (38.4%) said *yes* in the public hospital, and 26 (26.3%) said *no* there was no sense of urgency while 35 (35.4%) said they were *not sure*. In the private hospital, 40 (54.1%) said *yes* there was urgency and 15 (20.3%) indicated no and *lastly*, 18 (24.3%) said they were *not sure*. This indicates that both hospital realise the sense of urgency in the EHR implementation including improving, maintaining or upgrading the system as illustrated in Table 4.1 but there was a comparatively higher population in private hospital than in public hospital. The results imply that users in the private hospital understood the motive behind implementation of EHR system as compare to the public hospital users. The results also revealed some high level uncertainty from some users in public hospitals. However, this might be that the public hospital operated the EHR system paperless ever since it was opened in year 2002.

Table 4.2: Sense of urgency in the implementation of EHR systems (n=173)

Sense of urgency for EHR system	**Type of Hospital**		
	Public	**Private**	**Total**
(a) Yes	38(38.4%)	40(54.1%)	**78(45.1%)**
(b) No	26(26.3%)	15(20.3%)	**41(23.7%)**
(c) Not Sure	35(35.4%)	19(24.3%)	**53(30.6%)**
Total	**99(100%)**	**74(100%)**	**173(99%)**

4.3.2 Importance of change management in the adoption of EHR system systems in hospitals

Change management is a critical factor in the adoption of an EHR system in hospitals because any failure means lack of compliance on tools and techniques including managing people side of change in order to achieve anticipated outcome. Hospital management from both public and private hospitals were asked about the importance of change management in adoption of electronic health systems. This question was asked to understand the knowledge which hospital management have regarding change management in the implementation of EHR systems. Respondents from the public hospital were of the view that change management is a significant aspect of EHR system implementation. It allows the hospital to manage EHR system changes as planned from pre to post implementation. Furthermore it also prepare users to keep up with unpreventable system changes that the hospital might have no control over changes, in order to prevent change resistance from users. The public hospital also revealed that it takes approximately six month to a year to prepare everyone for major planned EHR changes to take place; this is done to make sure everyone affected by change development is ready for transition.

Respondent (1) from the public hospital emphasized the need for documentation of change management processes thus:

> *"In the hospital environment, change management needs to be documented for control and tracking progress. However, change management is an ongoing process as the system is continuously updated and modified to accommodate different user interface, hospital duties as well as improving operation."* Respondent three stressed the importance of change management and indicated that:
>
> *"Change management allows different departments in the hospital to compare challenges and also prevents them to occur in the future".*

Respondent (1) & (5) highlighted the inevitability of change management that:

> *"Change is inevitable hence applying change management principles is important to raise awareness and get buy in from users, this therefore allows the hospitals to easily identify people who are willing to adapt and identifying change champions, who build a strong team that will reinforce change in everyone involved"*

Respondent (4) indicated that:

"The importance of change management is to modernise the management of the system, to match the information technology society we live by aligning changes to match the society"

The management from the public hospital argued that change management needs to involve users, supported by thorough training as in the case of modifying or upgrading existing system. They further said that training reinforce users to do their work with confidence, understanding the role of the system in their tasks. On the other hand, the private hospital management highlighted that issues regarding change management processes is mainly the responsibility of the hospital head office. The management mentioned that the hospital head group have various hospitals in different sites nationwide; therefore, no change is simple done for one particular hospital as they share and access same information repository. Any EHR system changes occurring apply to the entire hospital group. Additionally, they were concerned with the slow implementation *(in phases)* of change management in the EHR system execution. Respondents (1, 3, 5 and 6) has this to say regarding the pace of change:

> *"There are different employees in the hospital exposed to different international technology trends therefore, the hospital needs to make sure that methodical change management strategy are in place and everyone understands the reason behind transition, in order to get upfront buy in. It is also significant to receive different views from hospital employees in order to acquire different touch points for success of project implementation".*

Respondent (4) from hospital said that:

> *"It is significant to acknowledge the change management aspect in the implementation of health information systems. Moving to the digital era is not easy but what is important is to equip and involve employees who will be working with the system in order for them to accommodate changes and not lose the essence of efficient health service delivery to patients."*

Respondent (2) highlighted the necessity of change management in technology use thus:

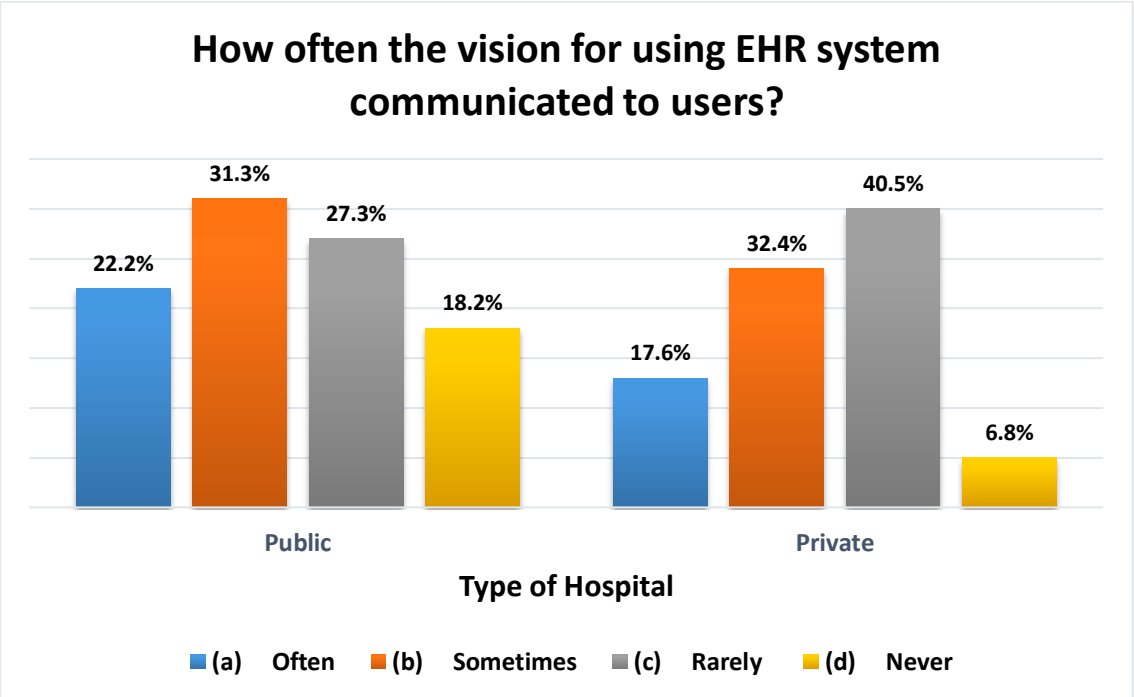
> *"Technology use in hospitals definitely improves efficiency and service delivery, however, in order for that to prevail well-structured change management strategy needs to be in place and align with the implementation process and amended"*.

The finding during interview in both public and private hospital shows that, the hospital management is cognisant and knowledgeable about the importance of change management in the execution of EHR system. In terms of the drivers, the private hospital revealed that change management process was mainly the responsibility of the head office; while in the public hospitals, the main drivers were the service providers that implemented the systems. This implies that both public and private hospitals users insufficiently contribute to the change management plan in the operation of EHR systems.

4.3.3 Communicating vision for EHR system implementation.

The study sought to see if the public and private hospital share the same vision with the users in the implementation of EHR systems. This question was asked to understand if users are well informed about the motive behind using EHR system in their daily tasks. It also sought find out if users understand what hospitals trying to achieve in the use of EHR systems. The findings from survey questionnaires revealed that 31(31.3%) of respondents in the public hospital indicated *sometimes*, the vision for using EHR system is communicated, while 27(27.3%) indicated that the vision is *rarely* communicated, only 22(22.2%) respondents confirmed that they often receive communication and 18(18.2%) said *never*. While majority of 30(40.5%) of users in the private hospital indicated that vison is *rarely* shared, while 24(32.4%) said *sometimes*, 13(17.6%) said *often* and only 5 (6.8%) indicated that the vision is *never* shared with them. The results are presented in Figure 4.8. The results imply that very few individuals often receive communication on the EHR system vision. This gives clear indication that small number people were frequently informed about the utilization of EHR systems in their job description.

Figure 4.1: Communicating vision for using EHR systems



4.3.4 Hospital management sharing with users reasons for any changes in the EHR system

The users were asked if the hospital management share reasons for making any changes to the EHR system. The importance of this question was meant to assess how often the hospital management engages and shares information with users (health employees) when changes occur in the EHR system. In the public hospital, 44(44.4%) of respondents confirmed that the hospital management *never* share reasons for system modification or alteration, while 22(22.2%) indicated that *sometimes* they know the reasons, 18 (18.2%) said reason are *often* shared with them and 16(16.1%) indicated that they *hardly* know the reason. On the other hand 22(29.7%) respondents from the private hospital said they *rarely* know the reason for changes in the system, 21 (28.4%) said the information is *rarely* shared, 17 (23%) indicated that they sometimes informed about changes and only 14 (18.9%) confirmed that they often know receive information on changes to occur, as indicated in Table 2.2. This goes to show that the hospital management *barely* share reason for EHR system modification with users in both hospitals. There is communication breakdown and inconsistency in the manner in which both hospitals engage with users concerning the system operation.

Table 4. 3: Hospital management on EHR system changes (n=173)

Sharing reason for changes in the EHR system	**Type of Hospital**		
	Public	**Private**	**Total**
(a) Often	18(18.2%)	14(18.9%)	32(18.5%)
(b) Sometimes	22(22.2%)	17(23%)	38(22.0%)
(c) Rarely	16(16.1%)	22(29.7%)	35(20.2%)
(d) Never	44(44.4%)	21(28.4%)	65(37.6%)
Total	99(100%)	74(100%)	173(100%)

4.3.5 Involvement of users in the implementation of EHR system in hospitals

Getting users to buy in is one of the most emphasised aspect of change management aspect in the implementation process. The study assessed the involvement of different categories users based on their respective duties. In the public hospital, 20 doctors (20.2%) indicated that they *often* involved and 11(11.1%) said *sometimes*. Majority of the nurses 26(26.3%) said they

sometimes involved, while 15(15.2%) said they *often* involved, 4(4.0%) said *rarely*, and 2(2.0%) said they *never* involved. While 5(5.1%) filing and ward clerks indicated they were *sometimes* included; 4(4.0%) said they were *often;* and only 1(1.0%) said they were *never* involved. With patient administrators, 4(4.0%) confirmed they were *often* involved; 3(3.0%) said they were *sometimes* and another 3(3.0%) said they *never* involved. In the private hospital, 6(8.1%) doctors indicated that they *never* involved; while 7(9.5) said they *rarely*; and 4 (5.4%) indicated they were *often* involved; but only 1(1.4%) said *sometimes* were they involved. While 18(24.3%) nurses indicated that they were *never* involved in any system implementation;10(13.5%) of nurses said they *sometimes* participate, 5(6.8%) said they were *hardly* involved, and 3(4.1) said they were *often*, while 2(2.7%) confirmed that they *never* involved, and only 1(1.4%) indicated that were *rarely* involved . On the other hand, filing or ward clerk 2(2.7) said *sometimes*, 2(2.7) indicated *rarely*, 2(2.7) said *never* and only 1(1.4%) indicated *involved*. In the case of patients administrators, 4(5.4%) confirmed they *never* involved, 3(4.1%) said *rarely,* and only 1(1.4%) said were *often* involved. The overall total for the private hospital indicated that 32(43.2%) of users were *never* involved, though 18(24.3%) said *rarely*. The end result for the private showed that users are *hardly* involve in the change management discussion. In the public hospital 43(43.4%) said they were *often* included and 44(44.4%) of respondents said *often*. These results imply that different EHR system users in the public hospital are much involved in the implementation process compared to users in the private hospital with lower involvement. Therefore, this reveals imbalance in the change management practice in the private hospital. Table 4.4 illustrates this.

Table 4.4 Involvement of users in the implementation of EHR system in hospitals (N=173)

Table 4.4: Involvement of users in the implementation of EHR systems in hospitals (n=173)

Frequency		**Doctor**	**Nurse**	**Receptionist**	**Filing or Ward Clerk**	**Patient administrators**	**Total:**
Public	Often	20(20.2%)	15(15.2%)	0(0.0%)	4(4.0%)	4(4.0%)	**43(43.4%)**
	Sometimes	11(11.1%)	26(26.3%)	0(0.0%)	5(5.1%)	3(3.0%)	**44(44.4%)**
	Rarely	0(0.0%)	4(4.0%)	0(0.0%)	1(1.0%)	3(3.0%)	**8(8.1%)**

	Never	0(0.0%)	3(3.0%)	0(0.0%)	0(0.0%)	0(0.0%)	**2(2.0%)**
Total:		**31(31.3%)**	**48(48.48)**	**0(0.00%)**	**10(10.1)**	**10 (10.0%)**	**99(100%)**
Private	Often	4(5.4%)	3(4.1%)	0(0.0%)	1(1.4%)	1(1.4%)	**9(12.2%)**
	Sometimes	1(1.4%)	10(13.5%)	0(0.0%)	2(2.7%)	2(2.7%)	**15(20.3%)**
	Rarely	7(9.5%)	5(6.8%)	1(1.4%)	2(2.7%)	3(4.1%)	**18(24.3%)**
	Never	6(8.1%)	18(24.3%)	2(2.7%)	2(2.7%)	4(5.4%)	**32(43.2%)**
Total :		**18(24.4%)**	**36(48.7%)**	**3(4.1%)**	**7(9.1%)**	**10(13.5%)**	**74(100%)**

Since the change management strategy compels different divisions to be involved, the hospital management were also asked of the key role that they play in the EHR system implementation. In the public hospital, the Information Technology Department is responsible for making sure that a suitable system is put in place. The ICT department also ensures that the IT company appointed for EHR system services urgently respond to queries logged by users when encountered challenges on the system.

Respondent (2) who have involved in the ICT management during interview highlighted that:

> *"Approximately fifty two (52) IT consultants from the IT company are accountable for responding to problems or calls logged by users. The company is further responsible for IT infrastructure, software, solution, support and maintenance"*

The nursing department in the public hospital during interview indicated that, their involvement in the EHR system implementation is mainly for developing templates for types of patient records kept in the system. The nursing department mentioned that they ensure templates for creating patient records are user friendly for nurses, in a manner that authenticity and accuracy of patient record is not compromised. In addition, the systems department is responsible for ensuring that EHR systems matches requirements and standards of the hospital and Department of Health, as certain clinical procedures add new fields or changes, therefore the electronic health records system also need to be updated to accommodate new changes. The human resource division is responsible for identifying staff to be trained by the IT company that provides EHR system services with help of the hospital departments. The case management division is responsible for ensuring that clinical information is accurately captured on the

system and distributed to medical aid companies, in order for the hospital to be reimbursed for services rendered to patients. The admission department when interviewed revealed not much involved the implementation process but only involved in the operation phase of the EHR system. The admission department indicated that they responsible for admission and new registration of inpatient and outpatients using the electronic health records system. They emphasised that they are more than willing to play a role and be involved in the implementation process should the opportunity avails itself, as they also are responsible for records creation.

In the private hospital, the management during interview revealed that they were not involved in the implementation process of the EHR systems. The private hospital management further indicated that the hospital head group is responsible for concept design for any changes occurring in the hospital, as the transition does not only affect their hospital. In the change management process, the hospital only gets involved during pilot test to check the effectiveness of the system. In that sense, the hospital provides input to the hospital group for improving efficiency of electronic medium and usually gives feedback when necessary.

On the involvement of the EHR systems, respondent (5) responsible for the system administration and coordination during interview said:

> *"The main function of the electronic implementation used in the hospital is prepared at head office, there is a team managing applications used in the hospital. Therefore, I am a link between our hospital and head office, when there are technical issues in the hospital. I also look at the hardware related issues and call service providers to attend to it. The hospital use separated applications for different duties. For example, the hospital uses billing system separate with the archiving system, in that sense; we have different systems in place"*

Respondent (4) echoed the same and elaborated that thus:

> *"My division is responsible for filing, digitizing of patient files, storage and archiving, working together with an external company specialising in records management. Therefore our record keeping is out sourced. We also use separate application for files that are archived on the external storage after being digitized. Only I as the manager have access to digitized files and physical files that are stored external can be requested and delivered in the hospital by the company. The hospital head group initiated the system used for these duties, we only report to them when we are facing technical issues. I also monitor the external company to make sure their meeting our hospital expectations when it comes to health records managements.*

Respondent (1) during interview concurred that:

> *"I am involved in the operation of the EHR system as the super user. I assist staff facing challenges using the system and I also train them"*

The survey reveals that in the public hospital, the external IT service provider, while in the private hospital all change management-related matters are handled by the hospital group head office and only get to be involved during the pilot phase does change management in the implementation of the system. This result implies that public hospital management and users are involved in the implementation process. In the private hospital, the management and users are not involved meaning the head group without the involvement of management and users prescribes the system to the hospital.

4.3.6 Support received by hospitals from the Department of Health in managing EHR

The majority of private hospital management during interview specified that there is no financial support received from the Department of Health in the implementation of EHR systems. They further mentioned that the hospital head group is responsible for all the system applications and use of electronic medium in delivering health service in their hospital. They additionally indicated that implementing the EHR system is expensive; hence, their hospital is partially electronic. The hospital head group is said to be executing this implementation in phases using different systems.

Respondent (1) during interview indicated that

> *"The Department of Health do come for auditing purposes, checking hospital space, the health and safety of patients and looking at the environment at large but do not support the hospital financially or in any manner in the EHR system operation and implementation*

On the other hand, the public hospital management confirmed that the hospital receives full support from the Department of Health. The management explained that Inkosi Albert Luthuli Central Hospital is fully funded by the Department of Health in the execution of EHR systems. The DoH together with the hospital is in agreement with the private partners including information technology company in providing the EHR system to the hospital. The researcher observed that the information technology company is located inside the Inkosi Albert Luthuli hospital building. The public hospital management further mentioned that the IT company covers the scope of electronic health records systems. They additionally indicated that the IT company also provides the hospital with planning and system design, procurement, system

integration, testing and commissioning, operating and maintenance. Change management provision and training on the EHR system is also provided by the same IT company. As put by the respondent (2), the Systems Manager during interview:

> *"The Department of Health supported by State Information Technology Agency (SITA) provides standards and guidelines that hospital need to match for Electronic Health Records System. For an example, SITA assists with system specification working together with the hospital and it involved procurement processes of the system*"

One of the interviewees, respondent(1, 3, 4 and 5) among the management members agreed that:

> *"The Department of Health offer workshops informing the private partners for all changes expected as the funding is fully covered by them"*

The study revealed that the private hospital is fully funded by the government in implementation of electronic health record system. While the private hospital head group is responsible for all the implementation of the system as it profit driven and privately funded. The survey further indicated that the public hospital is clearly supported by DoH clearly, there is no support received from DoH in the implementation EHR system in the private hospitals because they are commercialised.

4.4 CHANGE EXPERIENCED BY PUBLIC AND PRIVATE HOSPITALS DUE TO EHR SYTEM IMPLEMENTATION

The implementation of EHR systems in public and private hospital aim to improve health service delivery. For change to transpire in using technology systems in health institutions, organisational shift remains obligatory. Both public and private hospitals need to understand human position in the implementation process. Inadequate understanding of end users experience and organisational changes formed by utilizing the EHR systems may result to opportunities for establishing better change management approach being overlooked. In this regard, the researcher found out changes experienced by the public and private hospital due to EHR system implementation. The researcher further wanted to understand users' acceptance, challenges and benefits of utilizing the EHR systems. The findings were based on the following themes that are discussed:

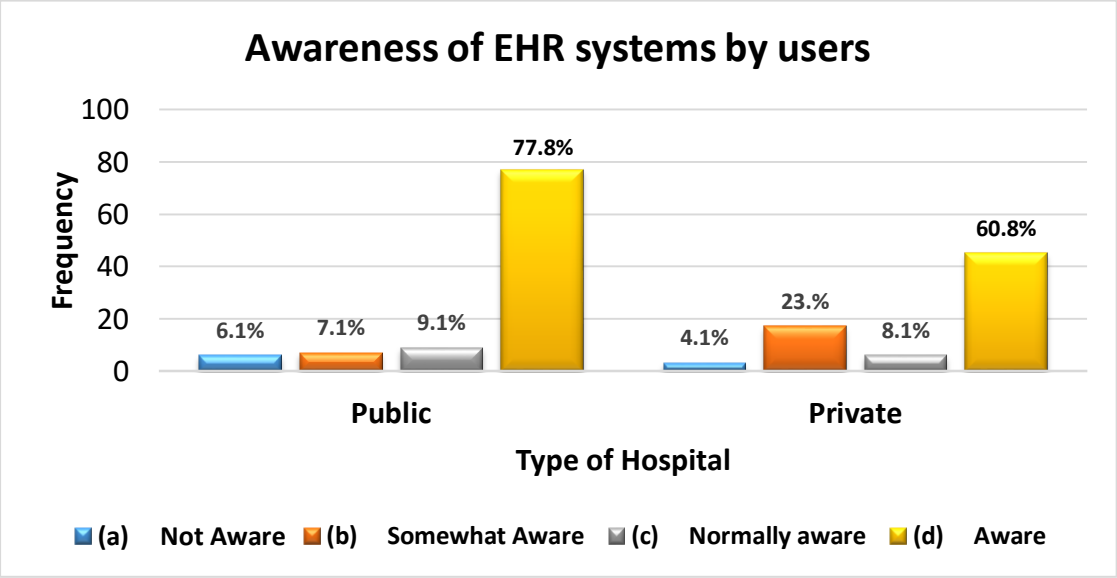
- Awareness of EHR system in public and private hospital;
- The use of electronic health records in public and private hospitals;
- Job restructuring in the implementation of EHR systems;

- User acceptance in the implementation of EHR systems;
- Challenges experienced by hospitals in using EHR systems;
- Benefits of using EHR systems in public and private hospitals.

4.4.1 Awareness of EHR system in public and private hospital

For change to materialise in the use of the EHR systems, there should be intense awareness by providing users with relevant information so that they could move the times and keep up with EHR system operation. Health employees in both hospitals were asked the extent to which they were aware of EHR systems in place. The finding revealed that the majority of respondents in both hospitals said they were cognisant of the use of EHR systems. Accordingly, in the public hospital 77(77.8%) said they were *aware*, 9(9.1%) said they were *normally aware* then 7(7.1%) said they were *slightly aware* and 6(6.1%) were *not aware*. In the private hospital, 45(60.8%) of users said they *aware*, while 6(8.1%) said they were *frequently aware*, 17(23%) were to *some extent aware*, and only 3(.1%) indicated they were *not aware* as illustrated in Figure 4.2. This implies that users from both public and private hospitals were aware of the use of EHR systems, and meaning orientation about the use of the system was done in both hospitals.

Figure 4.2: Awareness of EHR systems in public and private hospitals



4.4.2 The use of electronic health records in public and private hospitals

Using a multiple-response list, hospital employees were asked to indicate the use of EHR systems in the hospitals. The majority, 81(81.8%) of respondents in the public hospital said

they mostly used it for capturing patient information; 67(67.7%) utilised it for retrieving files; 57(57.6%) for admitting; 49(49.5%) used it for referring patients; and 43(43.4%) employed it for discharging. In addition, they also used if for prescription with a score of 36(36.4%), and diagnosing 32(29.7%); while 14(14.1%) said it was for billing purposes only. However, the latter mostly happens when they have patients referred from the private hospital. In the private hospital, 54(73.0%) of respondents indicated that the system is mostly used for capturing patient information; 45(60.8%) used it for admitting; 44(59.5%) used it for discharging, whereas 38(51.6%) used it for billing purposes. Contrary to the public hospital, all health services offered to patients in the private hospital incurred payments by the patients, hence billing system remain the most developed system in the private hospital. The hospital also used the system for diagnosing; prescription 17(23%); retrieving files 16(21.6%); and referring 15(20.3%). The findings in the public hospital showed that the use EHR systems mostly cover all records management related tasks. The high response level for retrieval of files attested to that, though the private hospital utilises electronic systems, but still depends on the manual filing system and digitized files and files are only provided on request. The results are presented in Table 4.5.

Table 4.5: The use of EHR systems in public and private hospitals

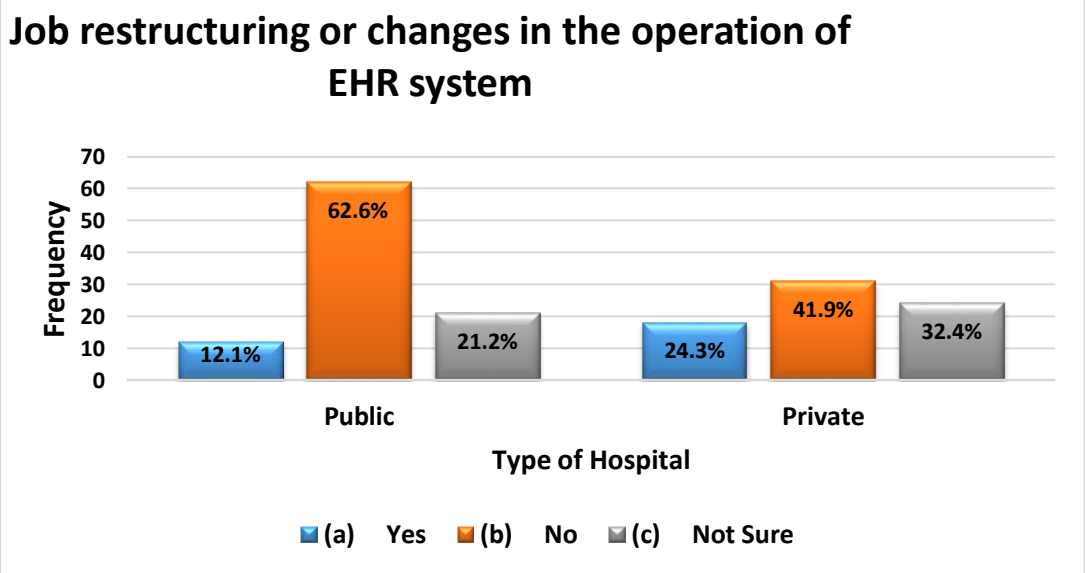
Use of EHR systems	**Type of Hospital**		
	Public	**Private**	**Total**
(a) Admitting	57(57.6%)	45(60.8%)	**102(59%)**
(b) Billing	14(14.1%)	38(51.4%)	**52(30.1%)**
(c) Discharging	43(43.4%)	44(59.5%)	**87(50.3%)**
(d) Referring	49(49.5%)	15(20.3%)	**64(37%)**
(e) Retrieving files	67(67.7%)	16(21.6%)	**83(48%)**
(f) Capturing patients information	81(81.8%)	54(73%)	**135(78%)**
(g) Prescription	36(36.4%)	17(23%)	**53(30.6%)**
(h) Diagnosing	32(32.3%)	22(29.7%)	**54(31.2%)**
(i) Any other task	9(9.1%)	4(5.4%)	**13(7.5%)**

4.4.3 Job restructuring or changes in job description in the use of EHR systems

The respondents were asked if there were any job restructuring or changes in their job description after using the EHR system. As shown in Figure 4.3, the majority of hospital

employees 62(62.2%) in the public hospital indicated that there were no changes in their job description; thus, 21(21.2%) said they were *no sure*; while only 12(12.1%) said *they noticed changes* in their job description. Meanwhile in the private hospital, 31(41.9%) indicated that they were *no changes*, 18(24.3%) said *there were changes* in their jobs; while 24(32.4%) were *not sure* of any changes in their job description. Clearly, the majority of users in the public hospital did not have their jobs affected by the system use; while some users in the private hospital experienced changes in that there were newer and additional tasks in their job content. For example, the researcher observed that nurses in the private hospital had to keep up with recording patient information using charts. In addition, they were also responsible for charging patients on the billing system for every medical services rendered. The researcher saw this as additional work as they also have to keep up with patient manual health chart. This implies that some users' job description changes without them realising in both hospitals. The results are illustrated in Figure 4.3.

Figure 4.3: Job restructuring in the implementation of EHR systems



4.4.4 User acceptance in the implementation of EHR systems

Recognising the need for managing changes from an early stage of the implementation process can influence the manner in which users perceive and accept the EHR systems (Erasmus, 2015). According to Wilkins (2009), many individuals in different environments have a tendency to stick to old practices than accepting new alternations particularly when the change management approach in the implementation process remains unrooted. Technology Acceptance Model drives the effect of EHR system in the hospital environment. Erasmus (2015) emphasised that the human factor should never be disregarded from an early

implementation stages as the system will certainly not results into positive outcome if it not accepted by it is users. It is in this regards the researcher wanted to assess the level of acceptance of EHR system use in both public and private hospitals. The study used Likert scale to understand features of users' acceptance in the implementation of EHR system. The researcher wanted to understand how users are familiarised with the system, their perception of EHR systems assisting them in their job performance. The researcher further wanted to understand the "*perceive ease of use*" and how users could believe the system in place challenges them to do their work. The findings were based on the following themes:

- Users familiarity with the EHR systems in public and private hospital
- Usefulness of EHR system in public and private hospitals
- Ease of use in EHR systems in public and private hospitals
- Attitude towards use of EHR system in public and private hospitals

4.4.4.1 Users familiarity to the EHR systems in public and private hospitals

Different health employees using the EHR system were asked to indicate their familiarity with the use of the EHR systems. This question sought to determine whether users are familiar or not with the current system in place. It also assisted the researcher to get an insight regarding the level of EHR system orientation in both hospitals. In the public hospital, the majority of doctors 28(28.8%) summed up responses of being *familiar* as well as *very familiar* with the system. Another joint response of nurses 47(47, 47%) indicated they were familiar with the system. While 6(6.06%) of filing and ward clerk indicated their familiarity; total of 10(10.1%) patient administrators said they were *familiar* with the system. In the private hospital, 17(22.98%) of doctors said they were *slightly familiar*; 25(33.78%) of nurses said they were *familiar*; 2(2.7%) summed up responses of the receptionists who indicated being *familiar*; 6(8.1%) of filing or ward clerk were also *familiar with the system*; and lastly, a total of 10(13.51%) patient administrators indicated in the affirmative. These findings showed that users in the public hospital are far more familiar with system in place as compare to users in the private hospital. This is summarised in Table 4.6.

Table 4.6: Familiarity with the EHR systems in public and private hospitals (n=173)

Frequency		Doctor	Nurse	Receptionists	Filing or Ward Clerks	Patient administrators	Total :
Public	Not familiar	0(0 %)	0(0 %)	0(0 %)	1(1.01 %)	0(0 %)	1(1.01 %)
	Somewhat familiar	2(2.02 %)	1(1.01 %)	0(0 %)	0(0 %)	0(0 %)	3(3.03 %)
	Familiar	12(11.11 %)	29(29.29 %)	0(0 %)	3(3.03 %)	6(6.06 %)	50(49.49 %)
	Very familiar	17(17.17 %)	18(18.18 %)	0(0 %)	6(6.06 %)	4(4.04 %)	45(45.45 %)
Total		**30(30.3 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Not familiar	1(1.35 %)	1(1.35 %)	0(0 %)	0(0 %)	0(0 %)	2(2.7 %)
	Somewhat familiar	5(6.76 %)	6(8.11 %)	1(1.35 %)	1(1.35 %)	3(4.05 %)	16(21.62 %)
	Familiar	12(16.22 %)	14(18.92 %)	1(1.35 %)	3(4.05 %)	3(4.05 %)	33(45 %)
	Very familiar	0(0 %)	11(14.86 %)	1(1.35 %)	3(4.05 %)	4(5.41 %)	19(25.68 %)
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51%)**	**74(100%)**

4.4.4.2 Usefulness of EHR system in public and private hospitals

The technology acceptance model was used to understand users EHR system acceptance. The purpose of this Likert scale was utilised for soliciting orderly categorical data in which health employees perceive the usefulness of the EHR system in doing their jobs. Different users in the public hospital were asked the manner they perceived the system to do their daily tasks. The majority of doctors, 30(30.1%) affirmed that the EHR enables them to their jobs effectively. Another joint response from nurses, 41(41.5%) affirmed that the system supports them to do their jobs *accurately*. In addition, 9(9.1%) filing clerks also agreed followed by 7(7%) patient administrators who affirmed that the system allows and supports them to do their jobs *precisely*. While in the private hospital, 11(14.9%) of doctors said the system enables them to perform their jobs *accurately*; 25(33.8%) summed response of nurses agreed that EHR system allows them to do their job *competently*, and a total of 2(2.8%) receptionists and 7(7%) patient administrators agreed that the system enables them to do their work *accurately*. The results showed that the public hospital benefit more in the use of EHR system as compare to

the private hospital benefit due to system not being fully operational. The results are displayed in Table 4.7 below:

Table 4.7: Electronic health records system enables users to do their job accurately (n=173)

Frequency		Doctor	Nurse	Receptionists	Filing or Ward Clerk	Patient administrators	Total :
Public	Strongly agree	20(20.2%)	15(15.2%)	0(0.0%)	4(4.0%)	4(4.0%)	**43(43.4%)**
	Agree	10(10.1%)	26(26.3%)	0(0.0%)	5(5.1%)	3(3.0%)	**44(44.4%)**
	Neutral	0(0.0%)	4(4.0%)	0(0.0%)	1(1.0%)	3(3.0%)	**8(8.1%)**
	Disagree	0(0.0%)	3(2.0%)	0(0.0%)	0(0.0%)	0 (0.0%)	**3(2.0%)**
	Strongly disagree	1(1.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	**1(1.0%)**
Total		**31(31.31 %)**	**48(47.47 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	4(5.4%)	8(10.8%)	1(1.4%)	3(4.1%)	6(8.1%)	**22(29.7%)**
	Agree	7(9.5%)	17(23.0%)	1(1.4%)	2(2.7%)	3(4.1%)	**30(40.5%)**
	Neutral	7(9.5%)	11(14.9%)	1(1.4%)	1(1.4%)	1(1.4%)	**21(28.4%)**
	Disagree	0(0.0%)	0(0.0%)	0(0.0%)	1(1.4%)	0(0.0%)	**1(1.4%)**
	Strongly disagree	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	**0(0.0%)**
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100 %)**

4.4.4.3 The use of electronic health records system use increases users' productivity

In this context, users were asked using multi response list to indicate whether the use of EHR system increased their productivity. In the public hospital, 25(25.1%) of doctors affirmed that using the system actually *increases their productivity*. Joint response of nurses, 40(40.4%) said the use of EHR system favours their work *productivity*; while 7(8.1%) of filing and ward clerks established that the system *increases their work pace;* and 9 (9.1%) patient administrators said the use of EHR system usually increases their work productivity. In the private hospital, the majority of doctors 12(16.3%) concurred that the system *speeds up their work productivity*; and combined response of *agree and strongly agree* have a total of nurses, 40(40.2%) who

found the system to be *increasing their work productivity*. Additionally, the summed response of *agree and disagree* from the majority of 2(3.8%) receptionists; 6 (8.2%) filing and ward clerks; and 8(12.2%) patient administrators affirmed that, the EHR system increases their job productivity. From the results, it is clear that the public hospital find the system more conducive as compare to the private hospital. This is summarised in Table 4.8.

Table 4.8: Electronic health records system increases users' productivity (n=173)

Frequency		Doctor	Nurse	Receptionists	Filing or Ward Clerk	Patient administrators	Total :
Public	Strongly agree	14(14.1%)	17(17.2%)	0(0.0%)	3(3.0%)	5(5.1%)	**39(39.4%)**
	Agree	11(11.1%)	23(23.2%)	0(0.0%)	5(5.1%)	4(4.0%)	**43(43.4%)**
	Neutral	4(4.0%)	7(7.0%)	0(0.0%)	2(2.0%)	1(1.0%)	**14(11.1%)**
	Disagree	2(2.0%)	1(1.0%)	0(0.0%)	0(0.0%)	0(0.0%)	**3(3.0%)**
	Strongly disagree	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	**0(0.0%)**
Total		**31(31.31 %)**	**45(45.45 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	3(4.1%)	4(5.4%)	1(1.4%)	1(1.4%)	4(5.4%)	**13(17.6%)**
	Agree	9(12.2%)	15(20.3%)	1(1.4%)	5(6.8%)	5(6.8%)	**35(47.3%)**
	Neutral	6(8.1%)	14(18.9%)	1(1.4%)	0(0.0%)	1(1.4%)	**22(29.7%)**
	Disagree	0(0.0%)	3(4.1%)	0(0.0%)	1(1.4%)	0(0.0%)	**4(5.4%)**
	Strongly disagree	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	**0(0.0%)**
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100 %)**

4.4.4.2 EHR system as an enable for users to easily access lot of information related to their jobs.

Using multi-purpose list, different users were asked whether when using the EHR system, they do access information related to their jobs easily. In the public hospital summed up response of *agree and disagree*, a total of 30 (30.3%) doctors indicated that the system enables them to *effortlessly access patient information* related to their duties easily. A total number of 43(43.43%) nurses agreed to *find information with no trouble*. Additionally, 2(2.7%) receptionists; 5(6.76%) filing and ward clerks; including seven (7.03%) of patient

administrators affirmed that EHR system makes it *easier to access information related to their duties*. While in the private hospital, majority of users seem to be *uncertain as to whether using the EHR system effortlessly allow them to access information related their duties*. This is shown by joint affirmative response by the majority who responded with *agree and neutral*. A total number of 14(18.92%) doctors indicated that, the system *partly help them to easily access information related to their duties,* followed by 29(39.18%) nurses who said the system *partially assist them to access information*. While two (2.7%) receptionists also agreed together with five (6.76%) filing and ward clerks including nine (12.17%) patient administrators. The results showed that use of EHR system in the public hospital allows users to access information linked to their job as compare to the private hospital. This implies that full implementation of EHR system is really a necessity in the private hospital to help users perform their duties efficiently. This is illustrated in Table 4.9 below.

Table 4.9: Using EHR system enable users to easily access information related to their job

	Frequency	**Doctor**	**Nurse**	**Receptionists**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	20(20.2 %)	22(22.22 %)	0(0 %)	3(3.03 %)	4(4.04 %)	**49(49.49 %)**
	Agree	10(10.1 %)	21(21.21 %)	0(0 %)	5(5.05 %)	3(3.03 %)	**39(39.39 %)**
	Neutral	1(1.01 %)	2(1.01 %)	0(0 %)	2(2.02 %)	1(1.01 %)	**6(6.06 %)**
	Disagree	(0 %)	2(1.01 %)	0(0 %)	(0 %)	2(2.02 %)	**3(3.03 %)**
	Strongly disagree	0(0 %)	1(1.01 %)	0(0 %)	0(0 %)	(0 %)	**1(1.01 %)**
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly Agree	4(5.41 %)	4(5.41 %)	1(1.35 %)	1(1.35 %)	4(5.41 %)	**14(18.92 %)**
	Agree	8(10.81 %)	11(14.86 %)	1(1.35 %)	4(5.41 %)	5(6.76 %)	**29(39.19 %)**
	Neutral	6(8.11 %)	18(24.32 %)	1(1.35 %)	1(1.35 %)	1(1.35 %)	**27(36.49 %)**
	Disagree	0(0 %)	3(4.1 %)	0(0 %)	1(1.35 %)	0(0 %)	**4(4.05 %)**
	Strongly Disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100 %)**

4.4.4.3 Electronic health records system as an enhancer for effectiveness in service delivery

Different users were asked to indicate the manner in which they perceive the use of EHR system in improving the overall health service delivery. In the public hospital, 26(26.26%) doctors affirmed that the system do enhance health services; 43(43.43%) nurses also agreed; followed by 9(9.09%) filing and ward clerk as well a total of 8(8.08%) patient administrators. While in the private hospital, the majority of users were in between as to whether the system do improve service delivery. This is because the system is not being used fully in the hospital. Therefore, the summed up response of *agree and neutral* from the majority of doctors for the private hospital were uncertain with 14(18.92%) doctor and 32(43.24%) nurses. However, 2(2.7%) receptionists agreed that the system do advance service delivery, although 5(6.76%) ward and filing clerks were not sure. Majority of patient administrators, 9(12.17%) agreed that the system do improve service delivery. The survey revealed that in the public hospital the EHR system is well established in the benefit of users and efficient hospital service delivery. Meanwhile, the results of the private hospital affirmed the necessity for the full EHR systems implementation in the benefit of users and the hospital. Table 4.10 below presents the results.

Table 4.10: EHR systems enhance users effectiveness in services delivery (n=173)

Frequency		**Doctor**	**Nurse**	**Receptionist**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	17(17.17 %)	13(13.13 %)	0(0 %)	3(3.03 %)	3(3.03 %)	**36(36.36 %)**
	Agree	9(9.09 %)	30(30.3 %)	0(0 %)	6(6.06 %)	5(5.05 %)	**50(50.51 %)**
	Neutral	4(4.04 %)	1(1.01 %)	0(0 %)	1(1.01 %)	2(2.02 %)	**8(8.08 %)**
	Disagree	1(1.01 %)	2(2.03 %)	0(0 %)	(0 %)	0(0 %)	**4(4.04 %)**
	Strongly disagree	0(0 %)	2(2.02 %)	0(0 %)	0(0 %)	0(0 %)	**2(1.01 %)**
Total		**31(31.31 %)**	**46(46.46 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100%)**
Private	Strongly agree	4(5.41 %)	3(4.05 %)	1(1.35 %)	1(1.35 %)	5(6.76 %)	**14(18.92 %)**
	Agree	8(10.81 %)	17(22.97 %)	1(1.35 %)	4(5.41 %)	4(5.41 %)	**34(45.95 %)**
	Neutral	6(8.11 %)	15(20.27 %)	1(1.35 %)	1(1.35 %)	1(1.35 %)	**24(32.43 %)**

	Disagree	0(0 %)	1(1.35 %)	0(0 %)	1(1.35 %)	0(0 %)	**2(2.7 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100 %)**

4.4.4.4 Electronic health record makes it easier for users to do administration tasks

In order to understand the perceive usefulness of the system, users had to indicate whether the system allowed them to easily do administration tasks. In the public hospital, 26(26.26%) doctors agreed that the system makes it *easier to do their admin work*; and supported by 26(39.39%) of nurses; and 8(8.08%) filing and ward clerks; as well as 6(6.06%) patient administrators. The private hospital presents the opposite with 14(18.92%) doctors' summed up response of *agree and neutral, but who* were not certain as to whether the EHR system allowed them to effortlessly do administration, followed by a total of 26(35.13%) nurses. Although 2(5.4%) receptionist agreed, and supported by 4(5.8%) of filing and ward clerks and 9(17.17%) patient administrators; these findings showed that there far more to be done in the private hospital for EHR systems to support as most users' administrative task compared to the public hospital. The participated private hospital in this study has electronic systems in place, it does not prioritise users' administrative tasks unlike collecting returns. The summary is shown in Table 4.11.

Table 4.11: Electronic health record makes it easier for users to do administration (n=173)

Frequency		**Doctor**	**Nurse**	**Receptionists**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	17(17.17 %)	18(18.18 %)	0(0 %)	3(3.03 %)	3(3.03 %)	**41(41.41 %)**
	Agree	9(9.09 %)	21(21.21 %)	0(0 %)	5(5.05 %)	3(3.03 %)	**38(38.38 %)**
	Neutral	4(4.04 %)	6(6.06 %)	0(0 %)	2(2.02 %)	1(1.01 %)	**113(13.13 %)**
	Disagree	(0 %)	3(1.01 %)	0(0 %)	0(0 %)	1(1.01 %)	**4(40.04 %)**
	Strongly disagree	1(1.01 %)	0(0 %)	0(0 %)	0(0 %)	2(2.02 %)	**3(3.03 %)**
Total		**31(0 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	3(4.05 %)	4(5.41 %)	1(1.35 %)	2(2.7 %)	5(6.76 %)	**15(20.27 %)**
	Agree	7(9.46 %)	15(20.27 %)	1(1.35 %)	2(2.7 %)	4(5.41 %)	**29(39.19 %)**

	Neutral	8(10.81) %)	11(14.86 %)	1(1.35 %)	2(2.7 %)	1(1.35 %)	**22(29.73 %)**
	Disagree	0(0 %)	6(1.35%)	0(0 %)	1(1.35%)	0(0 %)	**7(9.5%)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total :		**18(24.32 %)**	**31(40.54 %)**	**3(4.05 %)**	**7(8.11 %)**	**10(13.51 %)**	**74(100 %)**

4.4.4.8 Ease of use in EHR systems for public and private hospitals

Perception of ease of use is an extent users' view utilising EHR system free and effortlessly. According to Davis (1989), perceived ease of use have greater influence on perceive usefulness; therefore, a well-structured and executed change management approach in the implementation process of the system results to ease of utilization of the EHR system, effortlessly allowing users to easily engage with the system performing their duties without any difficulties. The study focused on weather users find it easily to fulfil administration and record management duties in public and private hospitals using the EHR system. Different EHR system users from both hospitals had to indicate whether learning EHR system was easy for them or not, in order to get their perception on how they view training conducted to them. In the public hospital, majority of doctors 26(26.26%) *agreed* it was *easy for them* to learn how to use the EHR system aligned to their duties. The nurses' responses of agree and neutral totalled r 34(34.34%), thus indicated that they were uncertain as to whether learning to operate the system was elusive for them. This number followed by 8(8.03%) filing and ward clerks; and 10(10.1%) patient administrators. The overall total indicated that users *agreed* to the easiness of learning the system. In the private hospital, the combined response of *agree neutral* was the popular as 17(22.97%) doctors, including 31(41.95%) nurses, followed by 3(4.05%) receptionist plus 6(8.11%)filing and ward clerks were all indecisive as to whether learning the system was easy. A total of 8 (10.68%) patient administrators *agreed* that it was easy for them. This result imply that users are prioritised in the use of the EHR system in the public hospital as compare to the private. There is recurring breach of ill-change management approach applied by the private hospital head group in the implementation of EHR systems. This is summarised in Table 4.12 below.

Table 4.12: Learning to use electronic health records system is or was easy (n=173)

Frequency		Doctor	Nurse	Receptionist	Filing or Ward Clerk	Patient administrators	Total :
Public	Strongly agree	14(14.14 %)	9(9.09 %)	0(0 %)	2(2.02 %)	2(2.02 %)	**27(27.27 %)**
	Agree	12(12.12 %)	22(22.22 %)	0(0 %)	5(5.05 %)	8(8.08 %)	**47(47.47 %)**
	Neutral	4(4.04 %)	12(12.12 %)	0(0 %)	3(3.03 %)	0(0 %)	**19(19.19 %)**
	Disagree	1(1.01 %)	5(5.05 %)	0(0 %)	0(0 %)	0(0 %)	**6(6.06 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	0(0 %)	4(5.41 %)	0(0 %)	1(1.35 %)	5(6.76 %)	**10(13.51 %)**
	Agree	10(13.51 %)	19(25.68 %)	2(2.7 %)	4(5.41 %)	3(4.05 %)	**38(51.35 %)**
	Neutral	7(9.46 %)	12(16.22 %)	1(1.35 %)	2(2.7 %)	2(2.7 %)	**24(32.43 %)**
	Disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
	Strongly disagree	1(1.35 %)	1(1.35 %)	0(0 %)	0(0 %)	0(0 %)	**2(2.7 %)**
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100 %)**

4.4.4.9 Easiness to record patients information using the EHR systems

One the most important aspects of using EHR system in hospitals is for the users to be able to effortlessly record patient information for future referral or retrieval. This certainly determines the usefulness of the system resulting from a well-executed change management plan anchored on regular consultation and communication with the hospital employees. In that regard, users were asked based on the Likert scale to indicate if they easily record patient information utilizing the EHR system. In the public hospital, 30(30.3%) doctors *agreed* with the statement, followed by 48(48.48%) nurses, 9(9.06%) filing and ward clerks; and 10(10.10%) patient administrators. In the private hospital, 17(22.97%) doctors *agreed neutral* on easy recording of patient information using the system together with 33(44.59%)nurses, 3(4.2%) receptionists followed by 7(9.46%). A total of 8 (10.82%) patient administrators agreed and confirmed the easiness of finding patient information using the electronic health records system. The results imply that the private hospital EHR system do not prioritise records management activities as compare to the public hospital. Accordingly, the private hospital seriously needs to review the

manner in which electronic system assists employees (users) in their daily tasks. The results are displayed in Table 4.13 below.

Table 4.13: Easiness to record patient's information using the EHR system (n=173)

Frequency		Doctor	Nurse	Receptionists	Filing or Ward Clerk	Patient administrators	Total :
Public	Strongly agree	18(18.18 %)	18(18.18 %)	0(0 %)	3(3.03 %)	2(2.02 %)	**41(41.41 %)**
	Agree	12(12.12 %)	30(30.3 %)	0(0 %)	6(6.06 %)	8(8.08 %)	**56(56.57 %)**
	Neutral	0(0 %)	0(0 %)	0(0 %)	1(1.01 %)	0(0 %)	**1(1.01 %)**
	Disagree	1(1.01 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**1(1.01 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	0(0 %)	3(4.05 %)	0(0 %)	0(0 %)	4(5.41 %)	**7(9.46 %)**
	Agree	7(9.46 %)	17(22.97 %)	2(2.7 %)	4(5.41 %)	4(5.41 %)	**34(45.95 %)**
	Neutral	10(13.51 %)	16(21.62 %)	1(1.35 %)	3(4.05 %)	2(2.7 %)	**32(43.24 %)**
	Disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
	Strongly disagree	1(1.35 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**1(1.35 %)**
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.4.4.10 Location of records using electronic health records system (N=173)

For hospitals to function efficiently in delivering health services, locating patient information remains significance as treatment and health related decision are dependent on accurate health records. The use of electronic records should make it easier for users to locate such patient information. Therefore, this can be achieved if the system is systematically tested and involves users from the initial stage or piloting period. This undoubtedly results into users to accept the use of the system in doing their daily tasks. In the public hospital, the agree and strongly agree responses accounted for doctors, 28(28.28%) who established that the EHR system easily allowed them to locate records; 44(44.44%) nurse also *agreed*. In addition, filing and ward clerks as well as patient administrators agreed with 9(9.09%) and 8(8.06%) respectively. At the private hospital, the main responses were derived from *(agree and neutral)* with a total of

16 (21.62%) doctors who moderately agreed to effortless location of records using the EHR system. Respectively, the nurses, 31(41.89%); the receptionists, 3(4.05%); the patient administrators, 6(8.1%) were all agreed. Furthermore, the survey revealed that in the private hospital, EHR system does not assist users in locating patients records as compared to the public hospital where patient record is stored in the system. The study established that there is lack of ICT integration in records management system used in the private hospital. This is summarised in Table 4.14.

Table 4.14: Location of records using EHR system (n=173)

Frequency		Doctor	Nurse	Receptionist	Filing or Ward Clerk	Patient administrators	Total :
Public	**Strongly agree**	18(18.18 %)	19(19.19 %)	0(0 %)	2(2.02 %)	2(2.02 %)	**41(41.41 %)**
	Agree	10(10.1 %)	25(25.25 %)	0(0 %)	7(7.07 %)	6(6.06 %)	**48(48.48 %)**
	Neutral	3(3.03 %)	3(3.03 %)	0(0 %)	1(1.01 %)	2(2.02 %)	**9(9.09 %)**
	Disagree	0(0 %)	1(1.01 %)	0(0 %)	0(0 %)	0(0 %)	**1(1.01 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	**Strongly agree**	1(1.35 %)	3(4.05 %)	0(0 %)	1(1.35 %)	4(5.41 %)	**9(12.16 %)**
	Agree	8(10.81 %)	10(13.51 %)	2(2.7 %)	3(4.05 %)	4(5.41 %)	**27(36.49 %)**
	Neutral	8(10.81 %)	21(28.38 %)	1(1.35 %)	3(4.05 %)	2(2.7 %)	**35(47.3 %)**
	Disagree	0(0 %)	2(2.7 %)	0(0 %)	0(0 %)	0(0 %)	**2(2.7 %)**
	Strongly disagree	1(1.35 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**1(1.35 %)**
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.4.4.11 Retrieval of records in HER system

In both public and private hospitals, users were asked to indicate whether they agree or not that the system allows them to easily retrieve information. A total of 29 (29.29%) doctors in the public hospital agreed with the statement, that the system allows them to effortlessly retrieve records utilizing the system. The nurses followed by 44(44.44%) the filing and ward clerks with nine (9.01%); and the patient administrators with eight (8.08%). In private hospital, the responses summed up from agree and neutral came from the doctors, 16(21.62%); 30(40.54%)

from the nurses, 3(4.05%), and eight (10.82%) patient administrators agreed that the system allows them to easily find records. The EHR system used in the public hospital promote users to perform their duties efficiently as the system allows easy retrieval of patient records. The results further imply that proper EHR unified system is required in the private hospital to help the hospital users easily retrieve patient records and efficiently perform their daily tasks. This is summarised in Table 4.15 below.

Table 4.15: Easy to retrieve records using the electronic health records system (n=173)

Frequency		**Doctor**	**Nurse**	**Receptionist**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	18(18.18 %)	20(20.2 %)	0(0 %)	1(1.01 %)	2(2.02 %)	**41(41.41 %)**
	Agree	11(11.11 %)	24(24.24 %)	0(0 %)	8(8.08 %)	6(6.06 %)	**49(49.49 %)**
	Neutral	2(2.02 %)	3(3.03 %)	0(0 %)	1(1.01 %)	2(2.02 %)	**8(8.08 %)**
	Disagree	0(0 %)	1(1.01 %)	0(0 %)	0(0 %)	0(0 %)	**1(1.01 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	1(1.35 %)	3(4.05 %)	0(0 %)	1(1.35 %)	4(5.41 %)	**9(12.16 %)**
	Agree	9(12.16 %)	11(14.86 %)	2(2.7 %)	3(4.05 %)	4(5.41 %)	**29(39.19 %)**
	Neutral	7(9.46 %)	19(25.68 %)	1(1.35 %)	3(4.05 %)	2(2.7 %)	**32(43.24 %)**
	Disagree	0(0 %)	3(4.05 %)	0(0 %)	0(0 %)	0(0 %)	**3(4.05 %)**
	Strongly disagree	1(1.35 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**1(1.35 %)**
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.4.4.12 Filing of records in EHR system.

Effective implementation of electronic health records systems have to allow users to do their duties easily including the filing of records. Different users were asked to indicate an extent they easily file utilising the EHR system. In the public hospital, 28(28.28%) doctors affirmed that it was easy to organize patient information using the system. The researcher confirmed this by observing the manner doctors interact with the system filling in patient health charts. First, 41(41.41%) nurses agreed with the doctors; while nine (12.12%) and eight (8.08%) patient administrators completely agreed. In the private hospital, 17(22.97%) doctors and 28(37.83%)

nurses, 3(4.05%) receptionist, 5(6.75%) filing and ward clerks were not fully agreeing to easy filing using the EHR system. This is because the hospital still uses manual patient charts to record health related information and create new chart for each patients visit. However, 8 (10.81%) patient administrators confirmed that they easily file patient information using the HER system .The result implies that the public hospital use the EHR system for all records management tasks in benefit of the users. In addition, he survey revealed that the EHR system used in the private hospital does not support nurses and doctors duties. The private hospital uses the electronic systems for running hospital administrative duties as opposed to patient health record management. This suggests that some users were not considered in the execution of EHR system. Table 4.16 presents the summarised form of the results.

Table 4.16: Perception of ease of use in filing records using EHR system (n=173)

Frequency		**Doctor**	**Nurse**	**Receptionists**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	14(14.14 %)	19(19.19 %)	0(0 %)	1(1.01 %)	2(2.02 %)	**36(36.36 %)**
	Agree	14(14.14 %)	22(22.22 %)	0(0 %)	7(7.07 %)	5(5.05 %)	**48(48.48 %)**
	Neutral	2(2.02 %)	5(5.05 %)	0(0 %)	2(2.02 %)	3(3.03 %)	**12(12.12 %)**
	Disagree	1(1.01 %)	2(2.02 %)	0(0 %)	0(0 %)	0(0 %)	**3(3.03 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	0(0 %)	4(5.41 %)	0(0 %)	0(0 %)	3(4.05 %)	**7(9.46 %)**
	Agree	7(9.46 %)	11(14.86 %)	2(2.7 %)	3(4.05 %)	5(6.76 %)	**28(37.84 %)**
	Neutral	10(13.51 %)	17(22.97 %)	1(1.35 %)	2(2.7 %)	2(2.7 %)	**32(43.24 %)**
	Disagree	0(0 %)	3(4.05 %)	0(0 %)	2(2.7 %)	0(0 %)	**5(6.76 %)**
	Strongly disagree	1(1.35 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**1(1.35 %)**
Total :		**18(24.32 %)**	**35(47.3 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.4.4.13 Challenges in using the EHR system

User acceptance also depends on understanding primary challenges faced by users in utilizing the system, this therefore form part of change management and EHR system acceptance in the hospital context particularly when the system matches users' job description. Different hospital employees from both public and private hospitals were asked to state an extent to which they experience challenges doing their duties using the system. In the public hospital, the majority of doctors 21(21.21%) *disagreed* and others provided *neutral response* in facing challenges using the system; and followed by 30(30.3%) nurses, 7(7.07%) filing and ward clerks together with 9(9.09%) patient administrators. Similar response was provided by the private hospital employees, as 15(20.27%) doctors *disagreed* and provided *neutral response*; while 32(43.25%) nurses, 3(4.05%) receptionists, 7(9.46%) and 4(5.41%) filing and ward clerk disagreed. Table 4.17 revealed that in the public hospital, their EHR systems is well developed and permit users to do daily tasks. The survey revealed that majority of users in the private hospital were unclear on encountering challenges in the use of EHR system. Accordingly, this affirms that users in the private hospital do not understand the role of the system in their clinical duties .The results are illustrated in Table 4.17.

Table 4.17: Users experiencing challenges doing daily duties using EHR system (n=170)

	Frequency	**Doctor**	**Nurse**	**Receptionist**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	4(4.04 %)	3(3.03 %)	0(0 %)	1(1.01 %)	0(0 %)	**8(8.08 %)**
	Agree	4(4.04 %)	9(9.09 %)	0(0 %)	1(1.01 %)	1(1.01 %)	**15(15.15 %)**
	Neutral	2(2.02 %)	9(9.09 %)	0(0 %)	3(3.03 %)	2(2.02 %)	**16(16.16 %)**
	Disagree	18(18.18 %)	21(21.21 %)	0(0 %)	4(4.04 %)	7(7.07 %)	**50(50.51 %)**
	Strongly disagree	3(3.03 %)	6(6.06 %)	0(0 %)	0(0 %)	0(0 %)	**9(9.09 %)**
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**9(9.09 %)**	**10(10.1 %)**	**98(98.99 %)**
Private	Strongly agree	0(0 %)	3(4.05 %)	0(0 %)	0(0 %)	0(0 %)	**3(4.05 %)**
	Agree	1(1.35 %)	13(17.57 %)	0(0 %)	2(2.7 %)	1(1.35 %)	**17(22.97 %)**
	Neutral	9(12.16 %)	19(25.68 %)	2(2.7 %)	0(0 %)	2(2.7 %)	**32(43.24 %)**

	Disagree	6(8.11 %)	1(1.35 %)	1(1.35 %)	4(5.41 %)	5(6.76 %)	**17(22.97 %)**
	Strongly disagree	2(2.7 %)	0(0 %)	0(0 %)	0(0 %)	1(1.35 %)	**3(4.05 %)**
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.4.4.14 Attitude towards the use of EHR system in public and private hospitals

Attitude of use in the utilization the EHR system influences the intention to use. Change management influences the attitude to use the system, through system orientation offered to hospital employees. The interest of users towards the system is determined by the way users engage with the system application after training provided. The technology acceptance is also reliant on the attitude of users (health employees). Multiple statements with Likert scaling were employed to understand the extent of attitude from hospital employees in using the system. Different users from both hospitals were asked if EHR system is well intentioned to assist them in performing their duties. In the public hospital, *all users agree*, this therefore is represented by combined response of agree and strongly agree with a rejoinder of 26(26.26%) from doctors, 43(43.43%) nurses, 9(9.09%) filing and ward clerks and all 10(10.10%) patient administrators agreed. In the private hospital, the main response was agree and neutral, which made the response to be undecided among the system users. This is confirmed by the agreement of 16(21.62%) doctors, 32(43.25%) nurses, 2(2.7%) receptionists, 5(6.75%) filing and ward clerks, and 9(12.17%) patient administrators. Therefore, the public hospital users show positive attitude towards EHR system utilization as compared to the private hospital. More training and orientation are needed by users to be confident in the utilization of electronic system already operational in the hospital and develop good attitude towards the system. The summary is shown in Table 4.18.

Table 4.18: Users find the EHR system good for hospital employees in performing duties

Frequency		**Doctor**	**Nurse**	**Receptionist**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	19(19.19 %)	14(14.14 %)	0(0 %)	3(3.03 %)	3(3.03 %)	**39(39.39 %)**
	Agree	7(7.07 %)	29(29.29 %)	0(0 %)	6(6.06 %)	7(7.07 %)	**49(49.49 %)**

	Neutral	3(3.03 %)	5(5.05 %)	0(0 %)	1(1.01 %)	0(0 %)	**9(9.09 %)**
	Disagree	22.02 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**1(1.01 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total		**31(30.3 %)**	**48(48.48%)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	2(2.7 %)	2(2.7 %)	1(1.35 %)	1(1.35 %)	5(6.76 %)	**11(14.86 %)**
	Agree	11(14.86 %)	19(25.68 %)	1(1.35 %)	3(4.05 %)	4(5.41 %)	**38(51.35 %)**
	Neutral	5(6.76 %)	13(17.57 %)	1(1.35 %)	2(2.7 %)	1(1.35 %)	**22(29.73 %)**
	Disagree	0(0 %)	1(1.35 %)	0(0 %)	0(0 %)	0(0 %)	**1(1.35 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total :		**18(24.32 %)**	**36(48. 65%)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.4.4.14 Perception of users on EHR system as wise idea

Users from both public and private hospitals were asked to indicate whether they agree or disagree with the use of electronic health records system as a wise idea. Summed up response of strongly agree and agree was the leading response from different health employees in the public hospital with 29(29.29%) doctors, 44(44.44%), 9(9.09%) filing and ward clerks and 9(9.09%) patient administrators were in between that utilizing the EHR system was a good idea. In the private hospital, 16(21.62%) doctors provided agree and neutral response; and followed by 29(25.68%) nurses, 2(2.7%) receptionists, 5(6.76%) filing and ward clerks, and 9(12.17%) patient administrators fully agreed that using the EHR system was the good idea for the hospital. The results imply that both public and private hospitals perceive the system as a prudent idea, as users revealed willingness to use the system. This is represented in Table 4.19 below.

Table 4.19: Using an electronic health records was a wise idea (n=173)

Frequency		**Doctor**	**Nurse**	**Receptionists**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Publi	Strongly agree	18(18.18 %)	18(18.18 %)	0(0 %)	3(3.03 %)	2(2.02 %)	**41(41.41 %)**

	Agree	11(11.11 %)	26(26.26 %)	(0 %)	6(6.06 %)	7(7.07 %)	**50(50.51 %)**
	Neutral	2 (2.02. %)	4(4.04. %)	0(0 %)	1(1.01 %)	0(0 %)	**7(7.07 %)**
	Disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total		**31(30.3 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**9(9.09 %)**	**99(100 %)**
Private	Strongly agree	2(2.7 %)	5(6.76 %)	1(1.35 %)	1(1.35 %)	4(5.41 %)	**13(17.57 %)**
	Agree	11(14.86 %)	19(25.68 %)	1(1.35 %)	4(5.41 %)	5(6.76 %)	**40(54.05 %)**
	Neutral	5(6.76 %)	10(13.51 %)	1(1.35 %)	1(1.35 %)	1(1.35 %)	**18(24.32 %)**
	Disagree	0(0 %)	2(2.7) %)	0(0 %)	0(0 %)	0(0 %)	**2(2.7 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total :		**18(24.32 %)**	**36(47.3 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.4.4.16 Perception of users on the EHR system as a positive idea for the hospitals

To understand the attitude of users, they were also asked to indicate whether they view the use of the EHR system as a positive idea in the hospital. The majority of the users in the public hospitals agreed, as confirmed by 28(28.28%) doctors, 43(43.43%) nurses, 9(9.09%) filing and ward clerks with 8(8.08%) patient administrators. Similarly, in the private hospital, the dominated response was agree and neutral response, which created the imbalance as to whether they view utilizing EHR system as a positive idea. The response from 16(20.62%) doctors, 26(35.14%) nurses, 2(2.7%) receptionists, 5(6.75%) filing and ward clerks, and 9(12.17%) patient administrators confirmed the use of EHR system as a positive idea. The survey revealed that the view EHR system as constructive idea as opposed to the public hospital. This gives a clear indication that the private hospital do not gain much in the use of EHR systems due to lack of ICT integration in records management and clinical duties .This is summarised in Table 4.20.

Table 4.20: Using an electronic health records is a positive idea

Frequency		Doctor	Nurse	Receptionists	Filing or ward Clerks	Patient administrators	Total :
Public	Strongly agree	17(17.17 %)	17(17.17 %)	0(0 %)	3(3.03 %)	2(2.02 %)	**39(39.39 %)**
	Agree	11(11.11 %)	26(26.26 %)	0(0 %)	6(6.06 %)	6(6.06 %)	**49(49.49 %)**
	Neutral	2(2.02 %)	3(3.03 %)	0(0 %)	1(1.01 %)	2(2.02 %)	**8(8.08 %)**
	Disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total		**31(30.3 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	2(2.7 %)	6(8.11 %)	1(1.35 %)	1(1.35 %)	4(5.41 %)	**14(18.92 %)**
	Agree	11(14.86 %)	19(25.68 %)	1(1.35 %)	3(4.05 %)	5(6.76 %)	**39(52.7 %)**
	Neutral	5(6.76 %)	7(9.46 %)	1(1.35 %)	2(2.7 %)	1(1.35 %)	**16(21.62 %)**
	Disagree	0(0 %)	4(5.41%)	0(0 %)	1(1.35%)	0(0 %)	**5(6.76%)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total :		**18(24.32 %)**	**36(47.3 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.4.4.20 Attitude of users on the like of using EHR system in public and private hospital.

In a multi-purpose response, users from both hospitals were also asked whether they like using EHR system, and the response rate indicated 28(28.28%) doctors, 42(42.42%) nurses, 9(9.09%) filing and ward clerks and 8(8.08%) patient administrators, like using EHR system. In the private hospital, some users agreed and some were neutral concerning whether they like using the EHR system. The result as confirmed by 16(21.62%) doctors, 28(37.84%) nurse, 2(2.7%) receptionists, while 9(12.17%) patient administrators indicated they full like using EHR the system. In sum, both users from public and private hospital affirmed that they like using EHR system in their duties. The survey also revealed absence of clarity from some users in the private hospital, and this might be due to the incomplete implementation of the system. This is displayed in Table 4.21.

Table 4.21: Attitude of users on the like of using EHR system

Frequency		Doctor	Nurse	Receptionists	Filing or Ward Clerk	Patient administrators	Total :
Public	Strongly agree	17(17.17 %)	14(14.14 %)	0(0 %)	3(3.03 %)	2(2.02 %)	**36(36.36 %)**
	Agree	11(11.11 %)	28(28.28 %)	0(0 %)	6(6.06 %)	7(7.07 %)	**52(52.53 %)**
	Neutral	3(3.03 %)	6(6.06%)	0(0 %)	1(1.01 %)	0(0 %)	**7(7.07 %)**
	Disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total		**31(31.31 %)**	**45(45.45 %)**	**0(0 %)**	**10(10.1 %)**	**9(9.09 %)**	**99(100 %)**
Private	Strongly agree	2(2.7 %)	3(4.05 %)	1(1.35 %)	1(1.35 %)	5(6.76 %)	**12(16.22 %)**
	Agree	11(14.86 %)	19(25.68 %)	1(1.35 %)	4(5.41 %)	4(5.41 %)	**39(52.7 %)**
	Neutral	5(6.76 %)	9(12.16 %)	1(1.35 %)	1(1.35 %)	1(1.35 %)	**17(22.97 %)**
	Disagree	0(0 %)	3(4.05 %)	0(0 %)	0(0 %)	0(0 %)	**3(4.05 %)**
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	**0(0 %)**
Total :		**18(31.58 %)**	**36(47.3 %)**	**3(4.05%)**	**6(10.53 %)**	**9(13.51 %)**	**74(100%)**

4.4.5 Challenges experienced by hospitals in using EHR systems

As much as the use of electronic health records might be beneficial to public and private hospitals, there are existing challenges in the use of the system, which users cannot control. The respondents were asked what challenges they encounter in the use EHR system in a multiple response. The majority of the users in the private hospital indicated that *slow retrieval* 40(54.1%) is a challenge for them; followed by *lack of connectivity*, 35(47.3%); and the majority of the users indicated *power cut and load shedding* ,57(75.7%); thus resulting to inadequate time with their patients. In the public hospital, the majority of the users indicated *insufficient time* to interact with patients has increased, (57(57.6%); as health providers have to feed information to the system as well. This was followed by user interface in the creation of records with 40(40.4%) resulting to data error.

Concerning the poor user interface in the public hospital, respondent (1), one of the public hospital management personnel during the interviews revealed that:

> *"Different systems used to treat patients require different user interface, information created by the systems form part of patient health record. Therefore, the interface around the system may not meet users' requirements, for an example, each doctor may have a different way of doing things but the system may not be accommodative in terms of what the doctor is trying to achieve".*

In the public hospital, users also complained that the electronic health records system used before the current system in place was much better. They further revealed that they were not informed why the previous EHR system changed. The survey further confirmed that the public hospital experience increases patient waiting time in the utilisation of the current EHR system. Respondent (2), one personnel during interview from the public hospital management confirmed that:

> *"The system somehow increases the patients waiting time as from time to time patients information need to be updated. As much as the information is captured on the system, not every data entered is migrated and kept by the system, therefore admission clerks need to verify with patients and record information missing".*

While in the private hospital, the high response also affirmed some challenges in the use of the EHR system. The survey established that file retrieval process is slow as the filing storage is located outside the hospital premises. The private hospital also revealed lack of network connectivity in the billing system. The researcher observed that the billing system frequently freezes. One respondent from the private hospital confirmed that:

> *"The system freezes continuously and causes frustration to employees, now and again it needs to be updated and maintained so to make employees work much easier".*

Findings from the private hospital also revealed that there was no alternative plan in place to overcome load shedding yet. The researcher observed that the private hospital also had limited charging points for the billing system used in hospital wards, which resulted to users struggling to keep up with billing patients their medical expenses, as they had to wait for one another. Respondent (2) from the private hospital management during interview also confirmed that:

> ***"****The system at time goes offline and limited billing systems leads nurses to wait for someone using the system in order to bill. There is no enough charging points and we have limited billing machine"*

This implies that even though the EHR system in the public hospital is utilised in full support of records management, slow retrieval of electronic health records affect users' productivity. It was also established from the private hospital that the retrieval process is challenging and slow due to records management activities not being linked to the clinical duties. The findings revealed that there are still various challenges encountered in both hospitals; thus suggests redirecting both hospitals to review the change management approach in the implementation and operation of EHR systems. Importantly, regular monitoring of the EHR system is necessary and users' slow the retrieval process. Table4.22 below summarise the findings.

Table 4.22: Challenges experience by hospitals utilizing EHR systems

Challenges using HER	Type of Hospital		
	Public	**Private**	**Total**
(a) Slow retrieval	29(29.3%)	40(54.1%)	**69(39.9%)**
(b) Poor data storage	13(13.1%)	10(13.5%)	**23(13.3%)**
(c) Lack of network connectivity	19(19.2%)	35(47.3%)	**54(31.2%)**
(d) Removal of records	3(3.0%)	8(10.8%)	**11(6.4%)**
(e) Data error	18(18.2%)	12(16.2%)	**30(17.3%)**
(f) Lack of anti-virus update	2(2.0%)	5(6.8%)	**7(4.0%)**
(g) Patient waiting time has increased	21(21.2%)	10(13.5%)	**31(17.9%)**
(h) Difficult in tracing records in the system.	9(9.1%)	3(4.1%)	**12(6.9%)**
(i) Lack of privacy and security to patient's information.	11(11.1%)	15(20.3%)	**26(15.0%)**
(j) Poor user interface in the creation of records.	40(40.4%)	6(8.1%)	**46(26.6%)**
(k) Power cut and load shedding.	0(0.0%)	56(75.7%)	**56(32.4%)**
(l) Insufficient time to interact with patients.	57(57.6%)	16(21.6%)	**73(42.2%)**

4.4.5.1 Problems encountered in managing EHR systems changes

Both public and private hospitals revealed challenges in managing electronic health records systems. The interview conducted with the one of the public hospital management, respondent (1) in the public hospital disclosed that:

"One of the challenging factor with the EHR application, at times the companies developing the EHR system software leave the country and it becomes a problem for the hospital to manage system upgrade, which alone somehow enforces the hospital to change systems over a period of time and find someone who can manage the system locally.".

The public hospital during interview also revealed that replacing the old system that was used previously in the hospital was a long challenging process. Meanwhile, reinforcing users to accept the process of changing systems or upgrading resulted to widespread resistance. In terms of training, respondent (2) indicated that:

"Training becomes challenging when upgrading or changing the system, as at time users resist change, demanding to understand why all of a sudden they are changing into a new system".

Respondent (4) from public hospital management agreed that:

"Starting training over again when moving from one system to another is one of the contributing aspects to user resistance… Another issue is that certain things the hospital only discover them, when the system is already live.

Respondent (5) from the public hospital management during interview revealed that:

"The capacity space on the system becomes a problem as number of patients captured and treated using the system increases. Due to this, from time to time, the system needs to be merged to accommodate changes in the way new or existing patients are treated."

The private hospital management respondents during interview indicated that, they not yet fully electronically however they do use different systems for dissimilar tasks in the hospital. Respondent (1) indicated that:

"Another current problem is that some aspect of the health services are very manual in the hospital; for example doctor's notes, prescription chat, patient chart, nursing notes and more".

They (the private hospital management) revealed that managing financial expenses that comes with the EHR system implementation process is extremely costly, and every technological changeover comes from the hospital head group. They further indicated that for their hospital head group to be fully electronically, the company needs a dynamic system to accommodate different storage requirements and different hospital sites, respondent (2) asserted that:

"The hospital have moved from one system to another. However when the new system was implemented the old system was not completely cut off because of patient valuable

information that can still be used for efficient hospital service delivery. The hospital is using the new system but the old system is still being used as the server for viewing notes transferring to the new system. The hospital is working in phases to fully migrate to the new system."

Respondent (4)from the private hospital management revealed that:

"The system is not fully electronic in our hospital, we mostly use the system for personal data capturing and billing, the system do not keep patient information electronically for every patient visit new record is created".

The private hospital management confirm that, the system at times goes offline and nurses end up doing manual billing, which they later need to transfer and capture on the system. Therefore, this results to users resisting the system, as they relapse to the manual billing. They also faced with limited billing screens leads to nurses to wait for someone using the system to bill, which results to nurses not billing correctly and it causes frustrations. The findings indicated that both public and private hospitals are facing challenges in the use of the electronic health records system. In the public hospital, it was revealed that even though they use the system they faced with the storage capacity on the system.

4.4.6 Benefits of using EHR systems in public and private hospitals.

Both public and private hospitals were asked of the benefit in the utilisation of EHR system. This question was asked to get an insight onto weather hospitals benefit and realise the meaningful use of the EHR systems. The findings are as follows:

4.4.6.1 Public hospital

Different users from nurses, doctors, filing or ward clerks including management in the public hospital were asked about the benefit of using the electronic health record system. The majority of the respondents 88(88%) revealed that they have limited access to patient's full records. The researcher observed that the access on the system is based on users' individual duties. The hospital emphasises on privacy and patient confidentiality. One user elaborated that Inkosi Albert Luthuli Hospital is mandated to promote excellent service delivery, as it is the largest hospital in the province. Respondent (2) from the hospital management during interview explicated that:

"*The hospital is up to date with technological changes of EHR system and prioritising advancement, it is for this reason the hospital is benefiting from the system use and enhancing other hospital to benchmark in the hospital".*

Similarly, the majority of 80(80.80%) respondents in the public hospital who mentioned that they happy with the current EHR system in place, indicated that patient information is always readily available in the system and it easy and quick to retrieve it. They specified that, the system provide accurate time and date, no need to decipher writing as patient information is typed. Additionally, patient administrators mentioned that the system interface is user friendly and allow them to fill patient information efficiently with no file duplication, decrease paper usage. They further said the system effortlessly allows easy consolidation of statistic reports efficiently and accurately.

Furthermore, nurses and doctors at Inkosi Albert Luthuli Central said they easily schedule referrals and future appointments and trace patient's health progress, and prescribe medication online and review previous treatment. The majority 82(82.82%) of the respondents indicated that records get to be kept in the system for a very long time without being missing even if patients are deceased, the system allows them to easily trace patient files. Users said electronic health records system saves time, decrease queues and increase time for patient care as it allows the hospital to attend may patients as faster as possible. They elaborated that the system have a recovery plan of records in case of disaster occurring. Similarly, records are kept in it is state of originality; no user can modify patient history. Users indicated that confidentiality of patient information is always protected and prioritised; there are security measures in place within the system.

4.4.6.2 Private hospital

In the private hospital, the majority of users, 56 (75.7%) revealed that they *do not fully use* the electronic health records system. However, they are benefiting from the fragment that have been implemented by the hospital head group mainly for billing purpose as the hospital remains profit driven. They elaborated that the billing system has great benefits including quick admission process and less patient waiting time. They indicated that patient data can be stored and traced without repeating the process, therefore it promotes time management. Patient administrators indicated the easiness and quickness to retrieve patient information once it is captured. Additionally, it allows users to delete errors captured and detected by the system, it promotes accuracy.

Nurses specified that the system enable them to identify easily patients admitted in wards, number of beds in use and those available, discharged and transferred patients. The system assists in daily charging of patients immediately when they receive medical attention in the

hospital. They indicated that though the billing process is quick but it frustrating and time consuming as the system freezes and get slow at times, therefore it limits times nurses should be interacting with their patients. They also confirmed that, though they benefit from using the system, load shedding whenever it occurs makes their work difficult and delayed. They further suggested full implementation of the system as they sometimes struggle to read doctors hand writing.

The researcher observed that record management in the private hospital is outsourced, and the hospital only deals with active files while patients are admitted. When patients are discharged, they send files for scanning in an archival off-site storage. However, the hospital have the system in place with limited access to request files offsite for emergency or litigation purposes. They stated that records are safely stored with limited access. The results showed that both public and private hospitals benefit differently from the system; and clearly suggests that the hospitals use the system for different reason.

4.5 MONITORING AND EVALUATION OF EHR SYSTEMS IN HOSPITALS

Monitoring and evaluation are significant in measuring the effectiveness, usefulness, and level of acceptance in the health institutions (WHO, 2017). Evaluating the value of impact of electronic health records systems is the crucial part of understanding the use of the system and it is users. According to the WHO (2017), it is crucial to acknowledge and consider monitoring and evaluation in the initial stage of the implementation process. WHO (2017) specifies that, the evaluation process be done on the regular basis and make use of correct indicators, in order to measure the impact of the system in the hospital and on it is users. One of the objectives of the study was to examine how public and private hospitals monitor and evaluate the impact of EHR implementation. The findings are based on the following themes

- Control plans to measure success or failure of EHR systems.
- Monitoring staff productivity in the use of EHR systems
- Feedback on the effect of using EHR systems in public and private hospitals.

4.5.1 Control plans to measure success or failure of EHR systems.

Personnel from public hospital management interviewed specified that, the system is controlled based on the penalty regime used against the private partners. They explained that there is a certain amount paid by the EHR system service providers called *penalty fee.* They elaborated that, when the service provider does not respond to queries on time, they compensate the

hospital. In that sense, the hospital controls and reinforces the service provider to deliver as expected. Respondent (8) elaborated that:

> *"Monthly based penalty reports are always drawn from footprint, which is the number of queries logged by system users and speedily attended by the service provider, based on the time set by the hospital to avoid penalty fee. Therefore, penalty fee is a certain amount paid by the EHR system service prodder if they did not respond to queries in time".*

Respondent (2), from IT division mentioned that:

> *"From the IT section, they are able to see if the records have been maintained properly, and people are being admitted correctly. As the hospital we often have meetings with the IT private company, where statistics and indiscretions are discussed, and they pick from there if the staff struggling with the system, if there are staff doing mistakes or if there is a trend of not understanding something".*

It was indicated by the management of public hospital management during interview that they regularly have Hlanganani meetings quarterly with the private partners to address issues on progress, and changes on the EHR system. In addition, reports and meetings assist the hospital to measure progress and to know the status of EHR system operation in the hospital. Respondent (7) emphasized that:

> *"The system get to be audited by the private firm of external auditors, internal auditors from the hospital, and auditor general (government) evaluating whether the system still meets needs of the hospital and make sure it operate well".*

Respondent (1) explained thus:

> *"The volume of patient information stored in the EHR system indicates success or failure of the system in terms of storage capacity, service rendered to patients indicates if new modules in the system need to be modified or introduced after the system was already implemented or upgraded".*

On the other hand, the private hospital operates differently compared to the public hospital. The private hospital management revealed that control plans and measures are conducted at the head office. One personnel, respondent (3) elaborated that:

> *"The hospital head office got a team that is responsible for the system from initiation phase, piloting and implementation including maintenance and system upgrade. The head office also assess the effectiveness of the system".*

The private hospital management confirmed that control plans are based on the objectives as to why the system was initiated in the first place, looking at the manner in which health

employees do their work using the system. They mentioned that control plans in their hospital are based on the time variance spent by health employees with patients versus on the system. This therefore gives them an indication whether the employees are productive or not using the system.

In terms of control plans in the private hospital, one of the personnel respondent (6) revealed that:

> *"Control plans are done through incident reports communicated by the hospital head office and the whole group receives it. The reports indicate specific hospitals and services impacted particularly system down time".*

Respondent (4) added that:

> *"The records management, scanning and storage is outsourced. So when the files are retrieved from the electronic system, checklist is used for evaluation and verification on patient's electronic files. At times, I find that certain files are scanned incorrectly, and returned to the external service provider. As someone responsible for accurate record keeping for our hospital, I do random visits to the external provider's site to assess their work, to measure their work and progress".*

Respondent (5) further said:

> *"There are no formal officialised procedures measuring the effectiveness of the system. However, I do suggest that the hospital head group have continuous evaluation processes in place to assess the effectiveness of the system, especially when it comes to billing system. In that way, they will know what challenges users in different hospitals are facing operating the system. This will also help to identify gaps in the system and improve productivity of our employees".*

Results presented from public and private hospital revealed that both hospitals operate differently, as they have their own processes of control plans measuring the use of EHR system. The public hospital uses penalty regime to reinforce the IT company to deliver as expected, meetings and reports are another tools they utilise including internal and external auditors. While the private hospital uses the time variance of time spent by employees to measure effectiveness and incidents reports. This shows that both hospitals decide on what works for them in controlling the EHR system and sustaining results.

4.5.2 Monitoring productivity with the use of EHR systems.

Respondents from both hospitals were asked if they had performance evaluation conducted whenever there are changes in the electronic health records system. The majority 92(92.92%) of respondents from the public hospital indicated that they normally evaluated after training

they receive on the system based on their individual duties. Users said they also write a test after each training provided by the IT company, assessing their level of competency to determine if they fit to use the system. They further elaborated that number of trending cases or issues reported are counted over a period and used to monitor their performance on the system. Majority of the respondents from the hospital management validated what their users at the public hospital said during the interviews as they were also asked if they monitor the effect of EHR system in staff productivity.

Furthermore, the public hospital management also confirmed that they have electronic measures used, within the system designed to measure productivity, accuracy and completeness of different users' duties. The hospital management revealed that EHR system generates errors report in monitoring users' productivity and each manager gets his or her staff to rectify and fill missing information. Respondent (1) from admission department during the interview revealed that:

"The EHR system in place do allow the admission department to monitor the registration process for each counter while staff are busy with their duties, from the number of patients in the waiting area to patients attended, discharged and admitted. The department is able to see people who are doing their daily task and who are not".

Respondent (3) from information systems elaborated that:

> "S*taff productivity is also monitored based on the number of patients who received medical attention, that an indicator to us if certain processes in the system need to be amended".*

Respondent (2) from technology department said:

> *"Data quality captured on the system is used to monitor staff productivity based on data coding. This is used to verify if users are following the right procedures capturing patient information. Verifying data captured by different users on the system also assists the hospital to easily determine users who need more training, more especially if there are lot of discrepancies".*

Furthermore, hospital management in the public hospital revealed that case studies and user studies are utilised to measure effectiveness of EHR system. The public hospital mentioned that it certainly effective and they are satisfied with the outcome of using EHR system in their hospital, as other health institutions are bench marking with them.

On the other hand, the private hospital do things differently as compare to the public hospital. The management from the private hospital indicated that the hospital have no standalone valid

measurements focusing on their hospital as most processes are head office driven and affect all hospital under their head office. However, they indicated that calls logged by users are indicators for measuring and monitoring challenges encountered by users on the system. As in the public hospital, the private hospital management indicated that discrepancies on the information captured signifies them if users are struggling with the system. Time variance spent on patients is also used as a tool to monitor productivity.

Respondent (5) from the private hospital management during interview said:

"The hospital conduct monitoring of staff productivity through statistics reports, number of patients admitted and medication stock control".

Respondent (3) personnel stated that:

> *"Auditing trial assist the hospital to know if the system is defaulting or when employees are struggling with the system leading them to be unproductive".*

From hospital CEO office, respondent (6) further explained that:

> *"Certainly, there is a way of measuring the effect of the system and staff productivity including all hospitals as we under one hospital head group. This is validated by incident reports they send through emails from time to time, indicating which hospital experiencing problems at a particular time".*

In addition, the management indicated that each department have their way of doing things. At times, the units monitor their staff productivity on the system based on their duties, therefore no standardised method in the hospital to measure the effect of the system as long as users can access the system and perform their duties; the monitoring is conducted as they continue using the system. All the above presented results imply that both hospitals have no officialised monitoring method; they simple do what is working for them at that particular time.

4.5.3 The use of EHR system in improving users' work.

Using the multi-purposes response users from both hospitals were asked in which manner they think electronic health records system improve their work. Majority of respondents 90 (90.9%) in the public hospital indicated that EHR keeps *information up-to date*, followed by those who stated that the system provides *accurate health information* 70(70.7%). They confirmed that EHR system results to complete patient information at a point of care 69(69.7%) which allows easy interaction and communication between health personnel 59(59.5%). In the private hospital, respondents indicated the system provides them with *highly accurate* health information 44(59.5%); *keeping information up to date* 43(58.1%); and *easy interaction and*

communication between health personnel 41(55.4%). The survey revealed that both public and private hospital benefit in the use EHR system. The study established that the private hospital only benefits from the portion that already implemented, as the EHR system is not fully utilised for all health activities. This is confirmed by the minority of 32(43.2%) response regarding complete *patient information at a point of care*. Table: 4.23 below illustrates the findings

Table 4.23: Response on the manner EHR system improve users' work (selecting more than one response) (n=173)

The manner EHR system to improve users' work	Type of Hospital		
	Public	Private	Total
(a) Provide accurate health information.	70(70.7%)	44(59.5%)	114(65.9%)
(b) Keep information up to date.	90(90.9%)	43(58.1%)	133(76.9%)
(c) Complete patient's information at a point of care.	69(69.7%)	32(43.2%)	101(58.4%)
(d) Easy interaction and communication between health personnel.	59(59.6%)	41(55.4%)	100(57.8%)

4.5.4 The hospital on the effect of using EHR system.

The respondents were asked to indicate how often the feedback is given to them on the effect of using EHR system. The finding revealed that in both hospitals, the respondents disclosed they *never receive feedback* from the hospital. In the public hospital, 27 (27.3%) respondents said *sometimes they do get feedback*; while in the private hospital, the majority of the respondents 25 (33.8%) said they *rarely receive it*, and 23(31.1%) said *they never*. Low response from both public and private hospitals implies that both hospitals hardly give feedback to the users on the effect of the EHR system as illustrated below in Table 24

Table 4.24: Feedback given by the hospital on the effect of using EHR system

Feedback on EHR system	Type of Hospital		
	Public	Private	Total
Often	10(10.1%)	10(13.5%)	20(11.6%)
Sometimes	27(27.3%)	14(18.9%)	41(23.7%)
Rarely	14(14.1%)	25(33.8%)	39(22.5%)
Never	45(45.5%)	23(31.1%)	68(39.3%)
Total	96(97.0%)	72(97.3%)	168(97.1%)

4.6 TOOLS USED BY HOSPITAL MANAGEMENT TO REINFORCE CHANGES AND SUSTAIN RESULTS IN THE EHR SYSTEMS

Hospital management is regarded as a capacity to support people and manage processes in a hospital context. In order to achieve change in the hospital setting, managers have a legal and moral obligation to inform, involve and reinforce employees to align with changes for high quality of patient care and improving health service delivery (Samuel et al., 2016). Hospital management are in a leading position to fortify policies and procedures including restructuring the organisational culture for the benefit of improving service delivery and creating conducive working environment for employees (Parand et al., 2014). Primarily, it is easy to adopt practice in response to immediate challenges or needs and considerable difficulty to maintain those practices overtime. The researcher wanted to understand the process of sustaining results to ensure the improvements of utilizing EHR system remain constant. The study sought to determine how public and private hospital management reinforce change and sustain results in the implementation of electronic health records system. The findings are divided into these themes:

- Tools and plans to reinforce change in public and private hospitals
- Training provided by hospital to employees in using EHR systems
- Change management policies and procedures in the implementation of EHR systems.

4.6.1 Tools and plans to reinforce change in public and private hospitals

The management from both hospitals were asked during interview about tools and plans in place to reinforce change in the implementation and utilization of the electronic health records system. Respondents from the public hospital indicated that workshops are conducted to promote the use of EHR system. On reinforcing the EHR system to users, respondent (1) indicated that:

> *"They make sure that users fully utilise the system changed or upgraded, only allow them to only refer and view records on the old system but not edit or add information. In that sense they reinforced to use the new system to perform their duties".*

Respondent (3) from the public hospital management one said:

> *"Electronic media, emails and meetings form part of tools and plans used to reinforce change".*

Similarly, respondent (4) explicated that:

"Demo recalling of different systems is used to assist the users refresh on their modules related to their daily tasks should they encounter any challenges".

Respondents (2, 7 and 8) further indicated that:

"Handbooks simplifying all steps involved in the actual workflow do assist the EHR users to find the system more user friendly and allows them to understand adjustments on the system more".

Respondent (6) said:

"The level of calls logged by users are utilised to analyse commonality of the problems or challenges encountered by the users in utilizing the EHR system. Therefore, that also gives indication if the vendor need to be involved to improve the system or as to whether the problem is with the users not understanding the system or if users need more training. All this is done liaising with the hospital management and all departments concern and involved".

In the private hospital, the management during interview highlighted that their hospital head group leads change management. However, they do have their ways of improving the utilization of the EHR system to their hospital staff. The hospital management commonly indicated that proper communication tool is the main key of reinforcing technological changes. They elaborated that information communicated necessitate transparency to every different groups of individuals involved as their hospital setting is very complex consisting of employees with dissimilar duties.

Respondent (4, 5 and 6) different departments indicated:

"If there are technical changes on the system, the head office run the logistic of system changes and pass the notification though system administrator about the new changes to take place. They indicate on which particular day changes will take place than forward the notification to all staff in the hospital via email. The departments also print out the notification and put it on notice boards indicating day and time of changes in case of down time on the system".

Respondent (3) unit manager from one of the departments said:

"We have system controller on site who is responsible for facilitating training to different units. We also have super users within the department who assist staff if they do not understand the system".

The hospital management commonly indicated that the hospital head group needs to utterly consolidate all existing systems in place and create one system that will reinforce users to utilise

the system. Both hospitals indicated that, when changes occur pertaining to the health information system in place, it is important to consult and involve people in the operation level from initiation stage, in order for changes to be consecutively done, and not when there are problems or challenges.

4.6.2 Training to employees in using EHR systems

The hospital management were asked to determine training provided to staff in utilizing the EHR system. The public hospital respondents mentioned that each department is responsible for the skill development of their own staff. However, the basic computer training is compulsory for every new employee at Inkosi Albert Luthuli Central Hospital as it uses the paperless system to do daily tasks. The management emphasized that no employee commence with their duties hospital without thorough basic computer training. They explained that computer training is done to ensure every employee is computer literate and proficient enough to be trained on the use of electronic health record system. They further elaborated that training on EHR system is offered based on departments and employees respective duties. Additionally, the IT company provides training and generate manual on EHR system application and software to ensure users have better understanding of the system. Similarly, test after training is conducted to measure level of understand on the system. They mentioned that certificate after training are provided to motivate users and to increase their willingness to learn. Respondent (4, 5, 6, 7 and 8) from public hospital management elaborated that:

> *"Reinforcement to users is done through training on EHR system that provided to all hospital employees respective of their departments and duties. Users write assessment test to measure their level of understanding, 75% pass rate is set to qualify for operating the system. If they obtain below the set percentage, the training needs to be repeated to obtain the percentage. Certificate are awarded to staff members to motivate them".*

The respondents at the private hospital commonly indicated, they have system controller personnel on site responsible for training users on the system and departments have super users assisting employees in any challenges they face on the system. The management revealed that the hospital head group personnel are responsible for training come in the hospital to train super users on theoretical and practical aspect of the information system than making the super users pass it on to other staff. Additional training is offered on request. Respondent (2) during interview indicated that:

"The hospital is lacking in refreshments training. Super users always take charge of training in their respective units with the help of the system controller whenever there is confusion in staff".

Respondent (4) added that:

"Intensive training was provided by external expect than we do run our own trainings including induction and super users assist in making sure everyone understands the system".

Respondent (3) further elaborated that:

"The training is provided by system controller and super users on the system; however, the hospital does need computer entrance training for operational staff and more technical training".

The findings imply that the public hospital do provide training to their staff including computer training; however, the private hospital only train their super users and systems control personnel on the system. This shows that the private hospital does have training for their staff but for all users and they also shortage in refreshment training.

4.6.3 Change management policies and procedures in the implementation of EHR systems.

Change management policies and procedures are referred as formal progressions in place for making changes in electronic health records system. Policies and procedures are intended to increase awareness, manage and control any proposed changes to improve the system and prevent user resistance.

Both public and private hospital management were asked during interview about change management policies and procedure guiding electronic health records systems execution. The public hospital management indicated that there are IT policies and procedures in place guiding the EHR system, supported by electronic system policies in change management, if there is a requirement to introduce or modify any software. They elaborated they have protocols that need to be followed and reviewed for any system changes including the testing and backup plan. They further explained that change control reference numbers are utilised for any system modification, with detailed information of change implemented. The management stated that once all the processes and reviews are completed, it than presented to the change management approval board for voting processes involving the hospital management and IT private company.

As regards the procedure, respondent (1) from public hospital during interviews said:

> *"There are standard operational procedures detailing how things are done, indicating who is responsible for what. The procedure gets amended from time to time accommodating new changes, aligning with the Department of Health operational".*

Respondent (3) echoed that:

> *"There are policies guiding the occurring changes. The policies are amended on a regular basis to make sure that everything is updated and in compliance with the system. There are also registration and downtime procedure for any occurrences for instances when the system is down not working, based on the guideline from policies users are informed in time. We have patient registration procedure and disposal of confidential information policy, which depends on the type of information in the record. The hospital also has policies on acceptance computer use as well".*

The public hospital management additionally revealed they have in-house policies and procedures for maintaining confidentiality concerning the implementation and operation of the electronic health records system. These are filtered for different users aligning with Promotion of Access to Information Act, Protection of Personal Information Act and National Archives of South Africa Act. The public hospital indicated that the on the strategic plan, it sets the specification for the service provider in matching the hospital needs for each department, with a mission to build one record comprising detailed information for patients.

Furthermore, the private hospital indicated that, there are official change management strategies in place, established by hospital head group and intended to guide the implementation and operation of health information systems. The hospital management affirmed that change management processes involve staff consultation when changes occur, with the involvement of human resource department when the roles are changing, the duties or scope of work including the staff performance appraisal, contract amendments to incorporate the new duties if affected. Respondent (2) said:

> *"When the new system is introduced or modified, the IT systems controller, head office and everyone affected get involved. For example, the hospital head group pilot two large hospitals, medium and small hospitals are preliminary tested to see the outcome it will have rolling it out to all hospitals. So our hospital gets to be involved in that sense".*

The private hospital management revealed that change management procedures include meetings and upfront discussions prior to changes taking place with the aim of understanding objectives, touch points and responsibilities prior to project roll out. They further explained

that changes that comes with technology does not only focus on technical part but it more about on people using it and in the case of their hospital setting it involve more hospital operational employees. Respondent (6)t agreed that:

> *"Policies in place are basically based on Protection of Personal Information Act, emphasising on the importance of confidentiality preventing record modification or authenticity".*

The findings from the study implies that public and private hospital have different policies and procedures in place in the execution and operation of the EHR system. The interviews revealed that the POPI Act, highlighting commonalities in the importance managing confidentiality in any system modification taking place or developments, guides both hospitals policies. However, there is no standardise guidelines where both hospitals comply under for policy and procedure developments. Both hospitals operate based on what works for them acknowledging legislatives.

4.7 CHANGE MANAGEMENT PRACTICE IN THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS SYSTEM

The implementation of EHR systems in hospitals is multifaceted, involving different factors including organisational culture, technology infrastructure, financial security, human capacity and skill developments. This therefore has ascended the public health sector in South Africa instituting strategies to drive the country towards meaningful developments and use of health information systems. For example, the eHealth Strategy of South Africa is an approach set to lead the Department of Health in improving service delivery and patient information nationwide via information and communication technology. The existing establishments overlooks the private health sector due to being profit driven, the focus remains on the public hospitals. The developments of health information technology compels change management practice to be in alignment with the implementation for efficiency. The study assesses the effectiveness of change management practice in the execution of EHR systems in public and private thus, the finding were divided into these following sub-themes:

- The use of EHR system in public and private hospitals
- Forms of communication to ensure hospitals have clear vision of using EHR systems
- Strategies and approaches to manage changes in EHR systems in hospitals

4.6.1 The use of EHR system in public and private hospitals

The effectiveness of change management in EHR system implementation results to users having intention to utilise the system. As executing ICT system normally takes time (IRMT, 1999, p. 48) particularity in the hospital setting. Therefore, it necessitate change management plan to be in place to establish intention to utilise the system in users. Therefore, intention to use has an important role in envisioning behavioural usage of the technology system in users (Samed Al-Adwan & Berger, 2015, p. 94). The respondents were asked to indicate their willingness to continue utilizing the system; the summed up response of agree and strongly agree in the public hospital was indicated by the majority with 31(31.31%) doctor, 39(39.39%) nurses, 9(9.09%) filing and ward clerks; and 8(8.08%) patient administrators who all showed their willingness to continue utilizing the EHR system. In the private hospital, the combined agree and 16 (20.27%) doctors, 28 (37.83%) nurses, and 2 (2.7%) receptionists confirmed neutral response. Those who stated they would probably continue to use the system were 6(7.95%) filing and ward clerk and 9(12.17%) administrators. These results imply that both public and private hospitals have the willingness to continue using the system. The results are summarised in Table 4.25.

Table 4.25: Users' probability of continuing using electronic health records

A		**Doctor**	**Nurse**	**Receptionists**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	18(18.18 %)	17(17.17 %)	0(0 %)	2(2.02 %)	3(3.03 %)	40(40.4 %)
	Agree	13(13.13 %)	22(22.22 %)	0(0 %)	7(7.07 %)	5(5.05 %)	47(47.47 %)
	Neutral	0(0 %)	8(8.08 %)	0(0 %)	1(1.01 %)	2(2.02 %)	11(11.11 %)
	Disagree	0(0 %)	1(1.01 %)	0(0 %)	0(0 %)	0(0 %)	1(1.01 %)
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	3(4.05 %)	5(6.76 %)	1(1.35 %)	1(1.35 %)	5(6.76 %)	15(20.27 %)
	Agree	8(10.81 %)	17(22.97 %)	1(1.35 %)	5(6.76 %)	4(5.41 %)	35(47.3 %)
	Neutral	7(9.46 %)	11(14.86 %)	1(1.35 %)	1(1.35 %)	1(1.35 %)	21(28.38 %)
	Disagree	0(0 %)	3(4.05 %)	0(0 %)	0(0 %)	0(0 %)	3(4.05 %)

	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.5.1.1 Continuous usage of EHR systems to do the work.

The respondents were asked if they intend to continue utilizing EHR systems to do their duties. The combined response of strongly agree and agree was 31(31.31%) doctors, 41(41.41%) nurses, 9(9.09%) filing and ward clerks, and 7(7.07%) patient administrators, whose response showed they intend to carry on using the system to perform duties. Meanwhile, in the private hospital, the summed up response of agree and neutral was indicated by users including 15(20.27%) doctors, 28(37.84%) nurses, and 2(2.7%) receptionists. At the same time, 6(8.11%) filing and ward clerk and 9(12.16%) patient administrators fully agree on that they intend to utilise the system do their work. The results suggest that in both public and private hospital, users intend to continue using the system to perform their duties. The results are illustrated in Table 4:26.

Table 4.26: Users intend to continue using electronic health records system to do my work

B		**Doctor**	**Nurse**	**Receptionist**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	18(18.18 %)	16(16.16 %)	0(0 %)	4(4.04 %)	3(3.03 %)	41(41.41 %)
	Agree	13(13.13 %)	25(25.25 %)	0(0 %)	5(5.05 %)	5(5.05 %)	48(48.48 %)
	Neutral	0(0 %)	5(5.05 %)	0(0 %)	1(1.01 %)	2(2.02 %)	8(8.08 %)
	Disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99100 %)**
Private	Strongly agree	3(4.05 %)	5(6.76 %)	1(1.35 %)	2(2.7 %)	3(4.05 %)	14(18.92 %)
	Agree	9(12.16 %)	16(21.62 %)	1(1.35 %)	4(5.41 %)	6(8.11 %)	36(48.65 %)
	Neutral	6(8.11 %)	12(16.22 %)	1(1.35 %)	1(1.35 %)	1(1.35 %)	21(28.38 %)
	Disagree	0(0 %)	1(1.35 %)	0(0 %)	0(0 %)	0(0 %)	1(1.35 %)
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100%)**

4.5.1.2 Frequent utilisation of electronic health records system in future.

Respondents were asked using survey if they will frequently utilise EHR system in future, this statement was intended to validate the intention to utilise the system going on wards based experience of current systems in place. In the public hospital, a total of 28(28.28%) doctors, 40(40.40%) nurses affirmed to use the EHR system in future; while 8(8.08%) filing and ward clerks, 8(8.08%) patient administrators responded with agree and neutral.. In the private hospital, the summed response of agree and neutral was shown by 15(20.27%) doctors, followed by 29(39.19%) nurses, 2(2.7%) receptionists, 6(8.11%) filing and ward clerk and 7(9.46%) patient administrators. The overall results at the public hospital revealed users' good experience with the EHR system, which therefore resulted to users having strong intention to continually the system in future. As regards users in the private hospital, the result established their willingness to utilize the system in future, but numerous users also revealed level of uncertainty. The results are summarised in Table 4.27 below.

Table: 4.27 Users will frequently use electronic health records system in the future.

Table 4.27: Users will frequently use electronic health records system in the future

C		Doctor	Nurse	Receptionists	Filing or Ward Clerk	Patient administrators	Total :
Public	Strongly agree	17(17.17 %)	18(18.18 %)	0(0 %)	2(2.02 %)	2(2.02 %)	39(39.39 %)
	Agree	11(11.11 %)	22(22.22 %)	0(0 %)	5(5.05 %)	5(5.05 %)	43(43.43 %)
	Neutral	3(3.03 %)	7(7.07 %)	0(0 %)	3(3.03 %)	3(3.03 %)	16(16.16 %)
	Disagree	0(0 %)	1(1.01 %)	0(0 %)	0(0 %)	0(0 %)	1(1.01 %)
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
Total		**31(31.31 %)**	**48(48.48 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**99(100 %)**
Private	Strongly agree	3(4.05 %)	5(6.76 %)	1(1.35 %)	2(2.7 %)	3(4.05 %)	14(18.92 %)
	Agree	9(12.16 %)	17(22.97 %)	1(1.35 %)	4(5.41 %)	4(5.41 %)	35(47.3 %)
	Neutral	6(8.11 %)	12(16.22 %)	1(1.35 %)	1(1.35 %)	3(4.05 %)	23(31.08 %)
	Disagree	0(0 %)	1(1.35 %)	0(0 %)	0(0 %)	0(0 %)	1(1.35 %)

	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
Total :		**18(24.32 %)**	**36(48.65 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**74(100 %)**

4.5.1.3 Users' commendation of the EHR system.

The respondents were asked whether they will recommend the use of EHR systems to others. From the public hospital, 27 (27.27%) doctors 42(42.42%) nurses, 9 (9.09%) filing and ward clerks, and 9(9.09%) patient administrators indicated they will recommend the utilization of EHR system to others. In the private hospital, the respondents also indicated their willingness to indorse the use of EHR systems. The combine response of agree and strongly agree has 15(20.27%) doctors, 28 (37.83%) nurses, 2 (2.75%) receptionists, 6 (8.11%), and filing and ward clerk, 9(12.16%). This implies that both hospital employees have intention to continue utilizing EHR systems and it reveals further that change management orientation was deep-rooted and made users understand the benefit of utilizing the system. This result means that users from both hospital realise the meaningful use of the EHR systems. This is illustrated in Table: 4.28.

Table 4.28: User response on recommending others to use the electronic health system records

D		**Doctor**	**Nurse**	**Receptionists**	**Filing or Ward Clerk**	**Patient administrators**	**Total :**
Public	Strongly agree	17(17.17 %)	19(19.19 %)	0(0 %)	1(1.01 %)	2(2.02 %)	39(39.39 %)
	Agree	10(10.1 %)	23(23.23 %)	0(0 %)	8(8.08 %)	7(7.07 %)	48(48.48 %)
	Neutral	4(4.04 %)	0(0 %)	0(0 %)	1(1.01 %)	1(1.01 %)	6(6.06 %)
	Disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
Total		**31(31.31 %)**	**42(42.42 %)**	**0(0 %)**	**10(10.1 %)**	**10(10.1 %)**	**93(93.94 %)**
Private	Strongly agree	3(4.05 %)	5(6.76 %)	1(1.35 %)	2(2.7 %)	6(8.11 %)	17(22.97 %)
	Agree	8(10.81 %)	17(22.97 %)	1(1.35 %)	4(5.41 %)	3(4.05 %)	33(44.59 %)
	Neutral	7(9.46 %)	11(14.86 %)	1(1.35 %)	1(1.35 %)	1(1.35 %)	21(28.38 %)
	Disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)

	Strongly disagree	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)	0(0 %)
Total :		**18(24.32 %)**	**33(44.59 %)**	**3(4.05 %)**	**7(9.46 %)**	**10(13.51 %)**	**71(95.94%)**

4.6.2 Strategies and approaches used to manage changes in EHR systems in hospitals

Strategies plays an essential part in organisational change and users' behaviour (Viljoen, 2015). Importantly, the Office of the National Coordinator for Health Information Technology (2016) stated that, change management strategies and principles should be merged into all stages of EHR system implementation. The role of strategy or approaches in any organisation is to plan an impact of the change anticipated (Viljoen, 2015, p.166). The hospital management from public and private hospital during interview during interview were asked about the strategies or approaches in place to manage EHR change. Respondent (2) from the public hospital management said that:

> *'There are meetings that are regularly held discussing change strategies to improve the electronic health records system, addressing all changes to take place, maintenance plan and system upgrade. The meetings concerning change management are mostly held in different levels from top management, middle management and lower management) so to have different inputs from all departments in the hospital".*

Respondent (4) further said that:

> *"The hospital provides training for every new employee. The hospital also offers refreshment training for employees who goes out of the system for more than two months for example long term sick or study leave, maternity leave etc. On a monthly basis, there are reports on EHR system from information technology department. Monthly reports assist the hospital in tracking and managing problems and coming up with solution".*

Respondents (5, 7 and 8) from public hospital elaborated that:

> *"Strategies used to manage change in EHR system includes involving staff more in every decision making for changes occurring. Getting strong buy in from EHR users. Another strategy that leads to successful EHR system implementation is when the hospital is changing to a new system; it pilots the system before going live to certain departments, for a particular duration of time. . The system is also monitored through reports from time to time".*

The public hospital management revealed that strong communication and involving staff in meetings concerning EHR system operation, it what makes the system more effective. The respondents further elaborated that another effective strategy in the public hospital is replacing

equipment, software or hardware during a certain time that forms part of the change management strategies as it certainly keeps the EHR system updated.

The private hospital management during interview indicated that, proper project planning, benchmarking, and concept designing prior to implementation including receiving feedback from end users form essential part of the change management strategy. They further mentioned post implementation review as another proper method of managing EHR change including continuous monitoring and evaluation of the system operation and measuring it is progress to ensure it does not fall off the anticipate outcome. Respondent (4) during interview elaborated that:

> *"Though the hospital does not always undergo new massive changes, but from time to time, the system get updated monthly. Notification of new changes normally get to be communicated with the rest of the hospital via emails or notice boards. For minimal changes, managers and ward clerks get training and pass it into their staff. However, if there are new massive changes affecting the entire hospital group, the head office take charge of training to ensure everyone understands the system".*

The hospital further elaborated that every new employee go through induction before commencing duties, including the refreshment training to accommodate new changes. They further explained that there are guidelines on the intranet and contact centre to respond to inquiries. The private hospital also emphasized that good communication is the key in making sure the hospital manage EHR system changes appropriately. The findings revealed that both public and private hospitals have their own strategies in place to manage changes in EHR systems. Each hospital does what seem convenient, although they do have common strategies in place; in particular, the manner training is conducted.

4.6.3 Communication channels in the use of EHR systems

Managing change in a hospital setting by frequently communicating is regarded is an essential part of implementing and managing the developments of health information systems (Antwi & Kale, 2014). The respondents revealed that there are different steering committees in place, comprise of top management, middle management, lower management and private partners ensuring that the hospital have clear vision of utilising the system. They further elaborated that emails are utilised to easily communicate the vision of EHR system and changes taking place. In addition, television screen mounted on a wall also displays information about the system

use. Emails signatures and banners promotes the awareness of the system. Furthermore, end user meetings are regularly held to get an insight of what is happening in the hospital. This also assists the hospital to understand easily challenges experienced using the system. Flyers are also used to educate patients about the system utilised in the hospital.

Similar to the public hospital, emails are used in the private hospital. However, internal alert emails are sent through unit managers, then printed out for staff, and pasted on notice boards. Verbal communication was also used through meeting with different hospital different structures in form of short departmental meetings with users, as the hospital is a very busy place with limited time. The hospital head office also disseminates information via senior managers in monthly meetings. The private hospital management mentioned that; each unit has green area meeting, unit management meeting and doctors meeting held from time to time concerning the systems use. The respondents indicated that staff communique in form of newsletter in payslips is also used as the form of communication. The hospital ensures that whenever there is major electronic system rollout or changes, staff are booked into discussing the changes to take place, propose and evaluate from there. Additionally, the hospital indicated that gateway or intranet have all the policies and procedure should one needs to refer. Precisely, both public and private hospitals have different communication channels in place that work in each hospital; however, the private hospital communication channels are not as strong as the public hospital.

4.7 SUMMARY

This chapter presented research findings from open-ended interviews, semi-structured questionnaires and research observation. The researcher analysed data in alignment with objectives of the study. The study revealed that both public and private hospitals were aware of the factors facilitating the use EHR system. However, very few individuals receives communication on the vision of using the EHR systems implementation and operation. Concerning job restructuring in the use of the EHR system, the study revealed that users' job changes without them realising. Both public and private hospitals do experience challenges in the operation of EHR system, although there are benefit in the use of electronic systems. The study revealed poor level of EHR system acceptance at private hospital, due to incomplete EHR system implementation. The chapter also examined monitoring and evaluation of EHR systems in both hospitals and showed that both hospitals had no standalone monitoring tools.

Similarly, the study also established the tools used by the hospital management in reinforcing change management and sustain results, while training was the primary finding emphasised by both hospitals in ensuring the use of the EHR system. The private hospital revealed there is need for fresh training to assist users to understand the system better. Chapter five discusses these results in depth.

CHAPTER FIVE

DISCUSSION AND INTERPRETATION OF RESULTS

5.1 INTRODUCTION

The previous chapter focused on the presentation of data. This chapter discusses and interprets the results presented in chapter four. Discussion and interpretation of results intend to convey what findings mean (Bavdekar, 2015, p. 40). This chapter discusses findings allied to literature with an attempt to respond the research questions of the study. Kalusopa (2011) indicated that improper interpretation might lead to unclear and inaccurate conclusion. Therefore, it is important that interpretation be done with the thoroughness and attentiveness. The study sought to assess change management in the implementation of electronic health records systems in public and private hospitals in the eThekwini area as noted in chapter one. The interpretation of results and discussion originate from key objectives of the study and sub-themes are engendered from the five following objectives:

- Factors facilitating the adoption of EHR systems in public and private hospitals.
- Changes experienced by public and private hospitals due to EHR system implementation
- Monitoring and evaluation of EHR systems in hospitals
- Tools used by hospital management to reinforce change and sustain results in the implementation of EHR system.
- Effective change management practice in the implementation of electronic health records system in public and private hospitals in the eThekwini area.

5.2 FACTORS FACILITATING THE ADOPTION OF EHR SYSTEMS IN PUBLIC AND PRIVATE HOSPITALS.

The interpretation and discussion of findings on factors facilitating the adoption of electronic health records systems in public and private hospitals are discussed based on the following sub-themes:

5.2.1 Sense of urgency to initiate, improve and upgrade EHR systems in public and private hospitals.

The current survey revealed that EHR systems users from public and private hospitals recognized the sense of urgency in the implementation of electronic health records systems. Kotter (2007) accentuated that change management converts successfully when motive to change involves people in the operational level, as this makes the management to understand challenges fostering towards positive end results.

According to World Health Organisation (2017, p. 48), the reason for implementing electronic health records systems must be established, from the current state of issues facing hospitals. In the public hospital, the EHR system was implemented to limit patient waiting time, prevent duplication, misplacement or loss of patient's files, and for easy referral of patient including improving communicating between health personnel. The study further revealed that the system was executed to prevent duplication of medical tests and promote accurate data reporting. The private hospital revealed same factors for the pubic hospital but emphasised that the current EHR system in place is mainly used for admission purpose, capturing patient information, billing patients and stock control for pharmacy. Various authors affirmed that developments and alignments of integrating Information Communication Technology in records management remain as a response to challenges facing hospitals in health service delivery (Luthuli, 2017; Marutha 2011; Pyrene, 2015; Erasmus & Van Der Walt, 2015).

In the public hospital, the EHR system covered all hospital duties from administration, patient healthcare and records management activities. The study established that the EHR system in the private hospital do not cover recording of patient health information and retrieval of files like in the public hospital. The study clearly indicated that the private hospital prioritise profit generating health services in the utilization of EHR system not records management activities. Similarly, the researcher observed that health records management activities in the private hospital were not linked to the system used by the hospital; this was also indicated by the hospital management. The study further revealed that the private hospital records management services are outsourced. In the same manner, Luthuli (2017), Marutha (2011) and Pyrene (2015) found that electronic health systems were not fully utilised to cover records management scope in hospitals, instead the record management was handled by commercialized record companies. The private hospital further revealed that implementing EHR system fully is

expensive as the hospital head group, involving different shareholders, operates their hospital. The study by Luthuli (2017,p.116) discovered that private hospital is formed by group of shareholders in alignment with the National Department of Health of South Africa. The study established that the private hospital finds it really difficult to keep up with electronic health records systems as they have to ensure that they not making any financial loss. Unlike the public hospital, the private prioritise the use of electronic systems for controlling and tracking financial expenditure in order to keep the hospital operational as oppose to allowing the system more conducive hospital employees.

On the other hand, the public hospital management indicated that the EHR systems allows easy consolidation and retrieval of patient files for litigation resolutions. The study further revealed that accurate statistics reporting also fostered the utilization of the EHR system in both public and private hospitals. Boonstra et al. (2014) affirmed that EHR system implementation improves consolidating and accessibility of patient data in health institutions, which is one of the eHealth Strategy of South Africa (2012-2017) principles, that is, to form and guide capacity development of health systems in order to accomplish accurate data reporting.

5.2.2 Importance of change management in the adoption of health information systems in hospitals

Changes in an organisation come at a high price, in the form of human capital (Viljoen, 2015, p. 28). Implementing EHR systems necessitate considerable resources of human measures (Boonstra et al. 2014). The adoption of technology in the hospital setting focuses more on clinical processes, workflow and daily tasks, but it is primarily influenced by the human resource component (Martin & Voynov, 2014). It is in this regards the problem statement of the current study in chapter one, indicates the gap of literature in change management in the implementation of EHR systems in hospitals. It is important that organisations comprehend the importance of change management and its anticipated outcome prior to EHR system implementation. The current study revealed that 38(38.4%) of public hospital users revealed that they understand the importance of change. However, almost equal response of 35(35.4%) users also revealed that they do not understand the motive behind using the EHR system. The imbalance response from users in the public hospital revealed that there are users who only commenced working at Inkosi Albert Luthuli Central Hospital and never been exposed to any

challenges in health records management. In the private hospitals majority 40(54%) users understand the prominence of change management in the adoption of EHR systems.

The study further revealed that, for major changes on the EHR system users are mentally equipped six months prior to changes taking place to prevent change resistance and fortify readiness. In the private hospital when there is major rollout, the head office group notifies the hospital on time while preparing for EHR system change. This finding revealed that both hospitals do have change management plan in the implementation of EHR systems. They study revealed that change management allows hospitals to prepare users while preparing for challenges that might occur. Fritzenschalt (2009) affirmed that management of change move an organisation from present state to a future desired state, by making sure challenges encountered get to be tackled while the implementation is still in progress.

Furthermore, both public and private hospitals accentuated that change management is a constant process unpreventable and at times unpredictable. Boonstra et al. (2014:23) attested that EHR system implementation relatively unpredictable due to unforeseen events, which hospitals cannot plan for. The study found that change management do assist the hospitals to raise awareness prior to system implementation, in order get support from hospital employees. Kotter (1995) emphasized on empowering people involved in the change process to get buy in and effective transition. The private hospital indicated that change management allows them to identify easily people who are willing to adapt to changes taking place, and from those people they identify as super users who help employees when they encounter problems, the super users or champions also provide support to their peers (Boonstra et al., 2014). Both public and private hospitals revealed that moving with the digital era is not easy; hence, it is important to include users more from the initial stage of the implementation process. Boonstra et al. (2014) emphasized that involvement of end-users creates commitment and enable flow in the adoption of EHR systems.

The study revealed that change management process in the private hospital is mainly the responsibility of the head office, as changes do not only affect one hospital but the entire hospital group. In the public hospital, the hospital management and IT Company carry out the change management process in the execution of EHR system. In essence, both hospitals do not have standalone change management plan, which is not good as hospitals cannot track EHR system implementation progress on their own. One respondents during interview underscored that change management process needs to be documented and continuously amended for

control and tracking progress. In that way, hospital will be able to assess the system effectiveness from *pre* and *post* implementation. The private hospital indicated that it significant to conduct the implementation of EHR systems in phases to ensure that the system is well received and understood as the hospital is dealing with human lives and legal documents and cannot afford any loss and damage of information. Thomas (2016, p. 65) found phases of adoption as barricade that impact the adoption of health information system. The author argue that phases of EHR system execution at times necessitate repetition and start again, hence it important to have change management processes in place and documented.

5.2.3 Communicating vision of using EHR system in the implementation process.

Frequent communication on the implementation and use of the EHR system is one of the most important expectations of the change management process, engaging with all employees in the organisation influence the expected outcome (Kotter, 1995). This therefore, allows everyone to be involved and have better understanding of changes taking place. In the public hospital, the findings revealed that the vision of using the EHR system is sometimes communicated confirmed by 31.3%, while other 27.3% said they rarely get the communication. In the private hospital, 40.5% said they never receive any communiqué on the utilization of the system and 32.4% indicated sometimes. Both public and private hospitals revealed inconsistency in the manner they communicating with users. This lack of communication discourage users' eagerness to accept the system and promote conflict between the hospital management and users. Nguyen and Swatman, (2009) believed that constant communication with staff is the most critical success element in managing organisational alteration. Kotter (1995) emphasised that strong communication reinforce people to be involved. Communicating the vision of what going to take place, how everyone will be involved, what expected from individuals and their team is important to the change management practice in the implementation of EHR system (Gesme & Wiseman, 2010, p.253). Similarly, IRMT (2009, p.76) specified that communication goes both ways, as it essential for the organization not to inflict change without listening to views or concerns of staff.

5.2.4 Hospital management sharing reasons on changes in the EHR systems.

The literature revealed that when hospital management share information with employees on changes taking place, it helps them to have better understanding of changes, benefits and their role in the EHR system implementation process. The survey established that public hospital management never share any reasons for EHR system modification or changes with hospital employees. Similar results were obtained in the private hospital. This result clearly showed

communication breakdown and inconsistency in the manner the hospital management engage with users. Kotter (1995) accentuated that attaining and understanding new changes is not an easy mission especially in complex environment.

5.2.5 Involvement in the implementation of EHR system in hospitals

The involvement of clinical and administrative staff at large in the EHR system implementation upsurges support and encourages user acceptance (Boonstra, 2014, p.23). The study established that public hospital users are involved in the execution process of EHR system. The survey further revealed that participation of users in the implementation of EHR systems was from nurses and doctors but not patient administrators and filing or ward clerk. In the private hospital, the survey confirmed that users including nurses, doctors, patient administration, filing and ward clerks and receptionists are rarely involved in the implementation process. This shows imbalance in the change management practice in both private hospital and public hospital. The findings showed that hospital management overlook the involvement of users in the implementation process and only focus on users' involvement in the operation phase. Study by Weeks (2014) found that clinical staff were not involved in the discussions concerning execution of EHR system but they were the one operating the system. Similarly, Boonstra (2014) attested that ample involvement and support of hospital management in the implementation of EHR system is certainly regarded as a positive exertion in accumulating efficacious outcomes, due to their influential positions but strong back up from the actual EHR system users is needed.

The study revealed that, the EHR system implementation in the public hospital also involves various departments from IT company appointed service provider located within the hospital premises. The IT Company is responsible for EHR system services and change management scope. The hospital's own Information Technology department ensures that EHR for computer software and hardware, system update and ensure the system is suitable for health services offered in the hospital. Unlike in the public hospital, the study found that only one system controller is the central linkage between the private hospital and head group office for any technical issues encountered by the hospital. However, for hardware issues, the system controller calls the service provider to attend to it. The private hospital do not have strong Information Technology services visible on site. The researcher observed that the system administrator job is excessively much to be carried by one person.

In the public hospital, the study revealed that the nursing unit is also involved the EHR system implementation. The nursing department is responsible for advancing templates on the system; including ensuring that the system is more user friendly for nurses while not compromising the authenticity and precision of the patient record. Furthermore, the system management department ensures the IT Company matches the standards of the Department of Health. The study also revealed that the human resource department is involved in the EHR system by determining staff to be trained by the IT Company with the help of the different departments. Thomas (2016, p. 69) asserted that it obligatory to identify training needs of the staff and resources necessary for effectiveness. The case management revealed that they responsible for ensuring that clinical information is correctly captured in the system. In addition, the case management department tracks and liaises with medical aid companies for the hospital to be reimbursed for health services rendered to patients. Most departments indicated to be involved in the EHR system implementation, although the admission department complained that they not much involved in the execution process of the system. Therefore, this imbalance change management visibility in the implementation of EHR system, as other users do not have say in the system they also using.

Unlike in the public hospital, the private hospital established that the head group office is fully responsible and involved in the implementation of the EHR system. The study revealed that the hospital only participated in implementation by being piloted on any electronic systems implemented, in essence that allows the private hospital to give input to the head office in the advancement of electronic medium by providing feedback when essential. Thomas (2016), Martin and Voynov (2014) affirmed that coalition members partaking in the implementation of EHR system have to be from various departments in the hospital, be well-mannered and respected and fully devoted and comprehend hospital operation. Crucially, users' participation from operational level is significant in the developments of EHR system as it can increase sense of ownership and commitment to the project headway (Katurura & Cilliers, 2018, p.5).

5.2.6 Support received by hospitals from the Department of Health in managing EHR systems

The developments of the EHR systems derive from the eHealth Strategy of South Africa, initiated by the Department of Health. One of the of the expected outputs from the health sectors is to strengthen the effectiveness the health systems, the documentation highlights that the eHealth Strategy paves a way for effective EHR implementation in order to have one National Electronic Health management System (eHealth Strategy of South Africa, 2012-

2017: 21). It is for this reason the hospitals from public and private health sector have a sense of urgency to improve health service delivery through integration of ICT in health records management. Accordingly, questions regarding support in change management from the Department of Health in the actual EHR system implementation remain unarticulated.

The findings revealed that private hospital management does not receive any form support from the Department of Health in the implementation and management of electronic health records system. During interviews with different management personnel, they all specified that the hospital head group is responsible for integrating the use of electronic medium in hospital health amenities. The study revealed that that execution of EHR systems is in phases in private hospital because it is expensive; hence, the hospital is not fully electronic. However, the Department of Health do audit the hospital from time to time in terms of the hospital environment and compliance with the health and safety measures of patient care. From the initial phase of eHealth developments, the focus was never on the private hospitals as the sector is profit-driven. South Africa Health Review, (2018:78) specified that inequality between public and private health sector is one of the challenging issues hindering developments of health initiatives set by government.

Dissimilar to the private hospital, the study found that the public hospital is fully supported by Department of Health in the EHR system implementation at Inkosi Albert Luthuli Central Hospital. The findings revealed that the department and hospital is in agreement with public private partners in the implementation of EHR system. The use of private partners was promoted as an output to improve ICT infrastructure in healthcare institutions (eHealth Strategy of South Africa, 2012-2017, p23). The hospital management revealed that from the initial opening of the hospital, they had a strong financial support from the Department of Health in the implementation of EHR system. Katurura and Celliers (2018) proposed that South African government should not only be in charge of distributing financial resources; however, form part of the active involved stakeholders.

The study revealed that the Department of Health supported by State Information Technology Agency (SITA) provides standards and guidelines the public hospital comply on, from system specification to procurement processes. Similarly, the study revealed that Department of Health together with the hospital further provide workshops informing the private partners of all the expected changes as the expenses of the systems is fully covered by them. Katurura and Cilliers (2018:5) opined that government should champion EHR system implementation together with

stakeholders. Marutha and Ngulube (2012, p. 58) emphasised that hospitals, through the support of the Department of Health should take charge of developing the records management system in order to improve health service delivery. Katurura and Cilliers (2018) found that the Department of Health continue to side-line supporting the private health sector in the execution and operation of EHR system; yet expect coalition in the National Health Insurance development to improve health services for South African citizen.

5.3 CHANGES EXPERIENCED BY PUBLIC AND PRIVATE HOSPITALS DUE TO EHR SYSTEM IMPLEMENTATION

Electronic records management developments are unavoidable resulting to changes in organisational duties, processes and guidelines (IRMT, 2007). Likewise, in hospitals, the EHR system implementation is evolving, consequent to anticipated and unpredictable changes. According to the (IRMT, 2007), it essential to manage and understand changes that come with electronic records management system, in order for people affected manage to cope efficiently. For changes to be managed, however, the x organisation and users must aware of the HER system and acknowledge it. The study presents the findings on the objective about changes experienced by public and private hospitals due to EHR system implementation, based on the following themes:

5.3.1 Awareness of EHR system awareness in public and private hospital

There are several factors influencing the meaningful use of EHR systems and awareness of users is one of the vital aspects to consider as it play prominent role in users accepting in the utilization of the system (Jathanna, 2017). The National Learning Consortium (2013) indicated that awareness promotes communication of EHR developments and continuous changes to users. The survey revealed that majority of users 77(77.8%) in public hospital are fully aware of EHR system. Likewise, in the private hospital 45(60.8%) users indicated to be cognisant about the electronic mediums in place. The results from both hospitals showed that, users are informed and orientated about the EHR systems in place. The study by Marutha (2011, p.198) found that health employees were cognisant of electronic health services in Limpopo hospitals. Nguyen and Swatman (2014) asserted that once awareness and practice in recordkeeping are enhanced, user resistance becomes a less concern as the technology is widely accepted. IRMT (2007) posited that there should be on-going awareness as a part of change management process to actively involve staff in the implementation of electronic records.

5.3.2 The use of electronic health records in public and private hospitals

The use of technologies and product solution offers organisations with enterprise-wide competence to capture, classify, store, retrieve and track e-records (Kalusopa, 2011, p.28). The integration of ICT into records management supports hospitals to enhance health service delivery. In the public hospital, the respondents revealed that the electronic health records systems is mainly used for capturing patient information 81(81.8%), retrieving files 67(67.7%), admitting 57(57.6%), referring patients 49(49.5%) and discharging 43(43.4%). The study further revealed that the public hospital uses the EHR systems system for records management activities, as users can retrieve patient information on the system. Thomas (2016, p.94) found that patient referrals are made easier through the use of health information systems and patient's file retrieval was much quicker in the implementation of EHR systems in Pretoria hospitals. In the private hospital, the survey revealed that the EHR system is used for capturing patient information as confirmed by 54(73.0%) respondents, and for admitting and discharging patients, 44(59.5%) and 44(59.5%) respectively. The researcher observed that for every patient visit, the private hospital creates new patient record. The argument is that unlike the public hospital, the private hospital does not use the system for records management activities. Marutha (2011,p.202) found that the system used in some hospitals in Limpopo province did not cover all patient details but mainly captured personal details of patients including financial details. The private hospital lacks broad integration of ICT in health records management functionalities. Similarly, Luthuli (2017) reported the same in the KwaZulu-Natal private hospital. Furthermore, it was observed in this study that the billing system is also the most established component in the use of electronic medium in the private hospital in comparison to the public hospital with 38(51.6%) response from users; this is because the private hospital is profit-driven. Marutha and Ngulube (2012) established that at times, hospitals utilise EHR system that does not cover all patient information, however capture only patient information and financial details.

Marutha and Ngulube (2012, p. 57) posited that it is necessary for electronic records management system utilised in hospitals to cover all patients information not only personal and financial details. Luthuli (2017), Marutha (2011), Pyrene (2015) and Katuu (2015) thereby recommended the use of electronic records management in hospitals to improve health service delivery; the hospitals do what works for their them in terms of records management.

Therefore, this is proven by the different systems used by the private hospital in rendering records management activities. However, the study found that the system that the private hospital refer as records management system is for archival purposes and it is not integrated to with any system, the hospital still adopts paper works and scan patient information to the system. IRMT (2009) argued that ICT integration in records management improve information flow and allows rapid retrieval of records.

5.3.3 Job restructuring in the implementation of EHR systems

According to McCarthy and Eastman (2010), effective change management approach empowers users with the new set of skills to match changes in job description. Accomplishing meaningful use of the EHR system at times enforces organisations to change how people do their work (National Learning Consortium, 2013). This is done to ensure that users understand the benefit of utilizing the system in alignment with their duties. Kotter (1995) specified that leader's in-charge of change in an organisation need to empower people and evaluate if there are any necessary changes in their job description, in order to ensure efficiency in the project instigated. The survey evaluated changes in their job description of hospital employees due to the EHR system implementation and operation.

This study found that majority of the users 62(62.2%) indicated no changes in their job description, whereas 21(21.2%) of users were not sure if their job description were reformed or reviewed. Similar findings were found in the private hospital with the majority of the users 31(41.9%) indicated no changes in their job description, while 24(32.4%) of the users showed uncertainty. The study found that nurses in the private hospital were concerned about the additional work brought by the billing system. They revealed that, they have to keep up with the billing system while also responsible for writing the patient chart manually. In both hospitals, the study revealed that job description changes without users realizing, as the system get updated recurrently to match health services offered by the hospital. Hoffman (2010) attested that job reform happens when the organisation changes the nature and function of employee's position. McCarthy and Eastman (2010) posited that developing individual skills to match organisational transition including job requirements, results in realistic and progressive change management outcome. Both hospitals need to review job descriptions of employees and inform them of changes.

5.3.4 User acceptance in the implementation of EHR systems

User acceptance in the use of ICT defines success or failure of the technology implemented (Davis, 1989). On the other hand, organisational culture plays an important role in a manner that the technology is accepted by it is users including the level of resistance towards the new technology (Erasmus, 2015). In the earlier work by Davis (1989) it was stated that people tend to use or not use technology system to the extent they believe it will help them do their jobs better. Furthermore, the author elaborates that even if prospective users believe that implemented system is useful, they may at the same time believe that the system is too hard to use and that the benefits of usage are surpassed by the willpower of using the executed application. However, the effectiveness of the electronic health records system in the hospital is dependent on how the health employees perceive the system. Therefore, the study evaluated the extent of user (health employees) acceptance in public and private hospitals based on the following themes:

5.3.4.1 Users familiarity with the EHR systems in public and private hospital

The study found that 94(94.94%) majority users in the public hospital are familiar with the EHR system. Likewise, the survey found 51(68.92%) of the majority of the users in the private hospital are familiar with the system. This finding affirmed that users from both hospitals are accustomed of the electronic health systems in place. Erasmus (2015) attested to building on individual competences and organisational capacity through orientation, which results in an effective change management culture.

5.3.4.2 Usefulness of EHR system in public and private hospitals

Davis (1989) defined perceive usefulness as the manner in which individual believes that utilizing a certain system would enhance their job performance. The study sought to find out how health workers perceive usefulness of the EHR system in carrying out their duties. This was significant as it aids to establish the extent of effectiveness in utilizing the system by the hospital employees. The current survey revealed that 87(87.8%) public hospital and 52(70.2%) private hospital users believed that EHR system enables them to do their jobs accurately as indicated in Table 4.6 in Chapter 4. The results clearly indicated that users in the public hospital and private hospital perceive use of the EHR system effective. However, the private hospital only refers to portion of the system already implemented as the system is not fully operational.

The survey also revealed that majority of the users in public hospital 82(82.8%) and private hospital 48 (64.9%) agreed that EHR system utilization upsurges their productivity. Erasmus (2015, p. 187) specified that EHR system acceptance by health professionals is an essential confirmatory to ensure that anticipated benefits emerge. However, nurses and doctors 22(29.4%) indicated to be impartial in the private hospital regarding increase of work productivity in the use of the system; as shown in Table 4.7 in Chapter 4. The researcher observed that nurses in the private hospital still record patient information in manual charts, and it was considered time consuming. The hospital management also revealed the same during the interviews. The majority of the users 88(88.88%) in the public hospital established that using EHR system allows them to easily access a lot of information that related to their jobs. In the private hospital, nurses' and doctors' 43(58.11%) response rate was the same, and only 27(36.49%) of users in the private hospital agreed that the system allows them to easily access information as indicated in Table 4.8. The study found that lack of records management activities in the implementation of EHR systems is limiting access to information to nurses and doctors in the private hospital, resulting to challenges in hospital administration processes.

Moreover, the majority of the users 86(86.87%) in the public hospital, confirmed that EHR system makes it easier for them to perform administration tasks as indicated in Table 4.9 in Chapter 4 . Similar to the public hospital, the users in the private hospital 48(64.87%) also affirmed that they effortlessly perform their administration duties. In the private hospital, the researcher observed that patient administrators and receptionists duties are generally favoured by the system, as all their duties are mostly merged in the system as compared to nurses, doctors and filing or ward clerks, hence 24(32.49%) of the nurses and doctors appeared to be imprecise on their response. Additionally, the study revealed that employees of the public and private hospitals 79(79.79%) and 44(59.46%) respectively agreed that the system do improve service delivery (see Table 4.10). The pattern of findings in the public hospital are consistent with the private hospital, meaning there is a positive perception of the EHR system in the public hospital (Gagnon, 2014). The study found that the EHR system in the public hospital is operated in favour of the users. Hence, the users perceived the system good. The study also found there no balance in the use and acceptance of the EHR system in the private hospital, because nurses and doctors still use manual administration processes. Emphatically, the system in place does not prioritise nurses and doctors' nature of work.

5.3.4.3 Ease of use of EHR systems in public and private hospitals

Perceive ease of use is defined as the manner in which potential users expect the technology system implemented to be free and effortlessly to utilise (Surendran, 2012, p.176). According to Davis (1989), users are likely accept an application system perceived easier to utilise. The study sought to determine if the electronic health records system in both public and private hospitals is perceived ease to use by health employees. The study established that the majority of the users in the public hospital 74(74.27%) and private hospital 62(83.58%) agreed that learning to use health records system was easy, and this is indicated in Table 4.11. Most users from public and private hospital concluded that they accepted the use of the system. This result clearly showed that usability of EHR system is dependent on how users perceive usefulness of the system from the initial stage of implementation (Mohamamad & Yuns, 2017). The findings revealed that users from the public hospital 97(97.98%) found it easier to record patient information utilizing EHR system, while in the private hospital, half of the users, 41(55.41%) agreed to the statement, and almost half of the users, 32(43.24 %) were uncertain as shown in Table 4.12. Furthermore, the researcher found that nurses and doctors still record health-related patient information manually, and only record billing information electronically. The finding showed doctors and nurses duties in use the EHR system is clearly ignored in the private hospital as compare to the public hospital. The survey showed that 89(89.89 %%) users in the public hospital find it easily to locate records using the EHR system as every detailed information of patients is kept electronically, while in the private hospital 36(48.65%) users were indefinite as to whether the system allowed them to locate records. The hospital management revealed that systems in place cater only for administrative duties, billing purposes, pharmacy stock control and capture personal related information. For those reasons, only half 36(48.65%) of the users agreed that they effortlessly locate records using the system, as indicated in Table: 4.13. The implication is that using both electronic medium and manual records system disturbs users and create resistance, more particularly with nurses, as they have to keep up with the billing system while manually recording patient information.

The survey further revealed that public hospital finds it easily to retrieve records using the EHR system, as showed by 90(90.9%) of the respondents from which 84(84.84%) users confirmed that they easily file patients records. Marutha and Ngulube (2012) found that creation of patient summary on referrals, retrieval of patient information as well as auditing clinical information is also fast utilising the electronic records system. On the other hand, only 38(51.35%) users in the selected private hospital agreed to retrieve records using electronic medium without any

difficulties, while 32(43.24%) users were inexact in their response. The researcher observed that electronic heath systems in the private hospital are not prioritising records management components. Kalusopa (2011) also found that organisations continue to be reliant on traditional ICT and they slow in adopting newer technology developments integrating records management duties. Therefore, it is for this reason half of 32(43.24 %) users were inexact in their response when it comes to filing using the system; while another half of, 35(47.3%) users agreed to easy filing of patient information using the system.

Additionally, in the public hospital, 66(66.3%) users indicated that they do not experience challenges utilising the system; while in the private hospital, 20(27.07%) users said they do not encounter any problems using the system. However, almost half of the users, 32(43.24%) were imprecise in their response, as indicated in Chapter 4 of the study. This implies that the users, particularly nurses in the private hospital have no understanding of EHR system usage in their duties, as it does not linked to their clinical and administrative duties. Boonstra (2014) concurred that customizing and adapting the system to meet specific needs of users will definitely increase likelihood of users finding the system more user friendly and minimise challenges of using the system.

5.3.4.4 Attitude towards use of EHR system in public and private hospitals

Attitude is concerned with the users' evaluation of engaging with a particular system application (Surendran, 2012). However, behavioural intention is the measure of the likelihood a person keep utilizing the information system. The study assessed users' behaviour towards the utilisation of EHR system in public and private hospital. This was important for the study to determine the casual effect the system project in health employee's intention to well perform their duties utilizing the system. The findings of the survey showed that using EHR system is good as shown by 88(88.88%) and 49(66.21%) public and private health employees respectively. This information was presented in Table 4.17 in Chapter 4. Yehualashe et al. (2015) also found that more than half of the majority of the health employees utilising the EHR system in their daily duties have good attitude toward the usage of the system. Similarly, Thomas (2016, p. 99) reported that attitude of users towards utilizing the electronic systems was considered to be greatly essential and in particular, if there is involvement of the people using it, throughout the implementation process.

In addition, employees considered using an EHR system as a wise idea, as confirmed by the response rate of 91(91.92%) 53(71.62%) from the public and private hospitals respectively.

However, this implies that users in both hospitals do realize the important role of using EHR system. Furthermore, the current survey showed public users 88(88.88%) and private users 53(71.62%) agreed that application of EHR system is the positive idea in the hospital setup. Additionally, the response rate of 88(88.88%) in the public and 51(68.92%) in the private hospital proven that users like utilizing electronic health records systems. This implies that understanding factors influencing EHR acceptance is one of the significance features in assuring it is prime and measurable benefits within the health environment and throughout the population of users (Gagnon et al., 2014). Therefore, this seems to correspond with the variable perceived ease of use in the TAM (Kalusopa, 2011). The overall results presented on chapter four affirm that users are more than willing to utilise the system in the best interest of their duties.

5.3.5 Challenges experienced by public and private hospitals in using EHR systems

The electronic health records system is considered effective and full when it can be preserved from its state of originality without any reform, including reliability of retrieval and accessibility (Marutha & Ngulube 2012, p.41). Though it is good that information technology can be used to strengthen access and management of records and in-formation (Marutha & Ngulube, 2012, p.41), the integration of technology use in records management has detectable challenges, particularly in the complex organisation like the hospital setting. The study found that challenges experienced by the public and private hospitals incomparable in the use of EHR systems as illustrated in Table: 4.20. The private hospital confirmed that slow retrieval of health records is challenging, the score of 40 confirmed this (54.1%). The hospital management indicated that this result from the reason that storage for patient's records is outsourced and located outside the hospital premises, therefore requesting files is a lengthy process and only one personnel is responsible for the system. IRMT (2009) posited that integration of ICT in records management should improve information handling and allow rapid retrieval of records.

The private hospital revealed that the billing system in use can be frustrating and time consuming in some instances as the system slows or freezes, and consequently limits nurses' interactions with the patients. The study found that the electronic system in place in the private hospital is only for controlling and tracking movements of patient files from the hospital to the offsite storage vice-versa, as it did not incorporate records management activities like in the public hospital. The study revealed that the hospital is still much reliant on recording patient

information manually for example doctor's notes, patient charts, and prescription notes as compared to the public hospital. The study further established that that the private hospital opens new files for every patient visit and files are then scanned by the outsourced company appointed for storing, retrieving and handling the hospital records. Luthuli (2017) also reported that the private hospital open new files for each patient visit. The implication is that the hospital experience uncontrolled duplication of files and difficulties in consolidating files on archival system as one patient have multiple files on the system. Botha et al (2014) affirmed that forming electronic health records, as part of the daily routine is another issue in the application of EHR systems. Therefore, this makes nurses' and doctors' work more challenging as they have to go through each and every file for follow up and for creating new patient file. Luthuli (2017,p.140) found that doctors and nurses dealt with lot of paperwork in the private hospital, while using electronic medium that did not cover records management facets. The researcher observed that computers in wards were only for administration purpose not linked to any records management activities. This finding is similar to Luthuli's (2017, p. 140) report on medical records management in public and private hospitals.

Furthermore, the private hospital revealed that lack of connectivity 35(47.3%) and load-shedding 57(75.7%) is another issue overwhelming the use of EHR systems. The hospital management revealed that that the system at times experience down times or goes offline, this therefore contribute to user resistance. Botha et al (2014) argued that shortage or absence of necessary infrastructure such as access to the internet connection challenges the EHR system implementation in South Africa. Thomas (2016) also asserted that load shedding is challenging the use EHR system, as health workers struggle to do their work without power. Luthuli (2017,p.136) also found that private hospital experienced power blackout and network downturns in the utilization of the ICT in private hospital in uMhlathuze area. Marutha (2011) reported similar challenges in Limpopo province, the hospitals experience system downtime. This confirms another widely existing problem in the use of EHR systems. Furthermore, the current study found that the private hospital also have limited charging points for the billing screen monitors in wards, which results to nurse struggling with the billing process.

In the public hospital, it was revealed that the use of EHR system results to insufficient time to interact with the patient as shown by a response level of 57(57.6%) as they also have to pay attention in the EHR system to ensure they capture patient information correct. Therefore, the current study discovers this as a form of excuse and sign of resistance. Botha et. al (2014) found hospital employees uncertain to change existing processes. The issue of employees being afraid

of change in the hospital setting should always be taken into consideration as change is a painful lengthy learning process including learning new operational ways (Marutha & Ngulube 2012,p. 56). However, the study by Thomas (2016,p.100) found that electronic systems can be obstructive as believed by some health employees. The author further posited that engaging with the computer while attending patients create a barricade or distance between the doctor or nurse and patient. Thomas (2016) further argued that change is uneasy, therefore in the implementation process, there will always be those group of individuals who adapt to change and move with it, and those who are reluctant and sit back. Therefore, it vital to have change management plan in the *pre* and *post* implementation stages to tackle the above-mentioned challenges.

The users in the public hospital confirmed that user interface in the creation of records is problematic with a response rate of 40(40.4%) as it results to data error at times. Therefore, the hospital management validated that the user interface in the EHR system at times was not meeting users' requirements, more particularly with doctors as they have different ways of doing things and the manner in which they treat patients changes from time to time, resulting to the system being updated frequently. The public hospital further revealed that not every data captured on the system is migrated or kept by the system; thus necessitates admission clerks to verify with patients and re-record missing personal information for every visit and it increase patient waiting time. The study found that user interface is challenging the public hospital resulting to users repeating same processes. In overall, both hospitals experience predictable and unpredictable challenges in the use of the system and it becomes difficult to prevent challenges for future occurrences. This result redirecting both hospitals to review the change management approach in the implementation and operation of EHR systems.

4.4.5.1 Problems encountered in managing EHR systems changes

The literature revealed the importance of managing changes in the implementation and use of electronic health records system but again there are unpremeditated problems hospitals encounter in the utilization of the systems. In the public hospital, it was revealed that companies developing and managing EHR system software at times leave the country and thereby becomes very challenging to manage system upgrade. Accordingly, it enforces the hospital to move from one system to another over a period, in order to find the company that can manage the system local. Content analysis conducted by Botha et al. (2014) found lack of appropriate software challenges the implementation of EHR systems in South Africa.

The study revealed that training becomes challenging in the public hospital when changing or upgrading the system, as users resist change, demanding to be well informed of the sudden change. At the same time, the hospital overlook refreshment training and importance of informing users even if it is about small details of change done on the EHR system. Hence, it becomes difficult for the hospital to predict and prevent changes that might occur in the system. It for this reason certain problems are only realized when the system is already live. Turchin et al. (2014) specified that introduction of EHR systems have unanticipated consequences. The public hospital revealed that storage capacity on the system becomes challenging as number of patients captured and treated using the system increases, therefore from time to time the system need to be merged in order to put up with changes in the manner that new or existing patients are treated. The private hospital also indicated that patient records are stored offsite due to limited space capacity in the hospital premises. The private hospital reported that the company need a dynamic electronic health records system to accommodate different storage requirements as hospitals are in number of hospitals in different sites. The study clearly indicates that even in the use of electronic systems, there is a challenge of storage capacity.

The study further revealed that the private hospital uses dissimilar systems to carry out different tasks as compare to the public hospital. The application systems used in the private hospital excludes records management activities as they still make use of paper for recording patient health related information. The hospital revealed that managing financial expenses that comes with the EHR system is exceedingly costly and all technological changeover comes from the hospital head office. Therefore, this finding implies that any changes done for one particular hospital in the use of the EHR system needs to apply to other hospitals under the hospital group. Botha et. al. (2014) and Thomas (2016, p.78) found that financial costs have unfavourable effect in the adoption of EHR systems from start-up cost, implementation and user training.

Similarly, the study established that the public hospital still employs the old EHR system that was replaced to view old notes; however, users complained that EHR system used earlier was better than the current one. The private hospital still uses the old system as server for viewing old notes and transferring information to the new system utilised during point of care. The study established that both hospitals have moved from electronic to another. Both hospitals still relies on the old EHR systems as the information is not all migrated to the new systems. The study established that not all users have accepted the EHR system put in place. The findings clearly indicated that both public and private hospitals are facing challenges in the use of the electronic health records system.

5.3.5 Benefits of using EHR systems in public and private hospitals.

Technology utilization has become an empowering tool in the health service delivery (Farusa & Coleman, 2018, p.1). Studies by Luthuli (2017), Marutha (2011), Pyrene (2015), and Katuu (2015) acclaimed ICT integration in records management to improve health services in hospitals. The implementation of electronic health records ought to carry out positive change in healthcare personnel work-flow with a mission to improve point of care for patients as well. Even though there are numerous hindrances in the implementation of EHR systems, there are also fruitful outcome experienced by hospitals in the use of the system. In the current study, the public hospital management revealed that the use of EHR system at Inkosi Albert Luthuli Central Hospital is feasible and effective as the system is fully utilized. The public hospital indicated that different hospitals around the country benchmark with them to initiate the developments of executing the EHR systems. In the private hospital, the study revealed that the EHR system is not fully utilised particularly in the scope of managing health records. However, the hospital management confirmed that they are benefiting from the portion of the implementation already activated in the hospital, primarily the billing and pharmacy stock control as the hospital is profit driven. The private hospital could also benefit from the system like the public hospital if full implementation of EHR system is considered. This results clearly showed that the public and private hospital use the EHR system for different purpose and duties.

The public hospital further revealed that it easy to retrieve and access patient information, as it always readily available in the EHR system during patient care. Similarly, the private hospital revealed that it is easy and quick to retrieve patient information primarily biographical data once captured on the system, and it allows users to delete errors identify by the system. Weeks (2014, p.117) posited that the most advantageous factor about utilizing electronic systems is the effortlessly availability of patient information during clinical encounter. The public hospital additional revealed that EHR system constantly provides accurate time and date. The public hospital revealed that there is no need to decode writing as patient information is fully typed. In the private hospital, the study revealed that nurses struggle with doctor's hand-writing as patient's charts and doctors' notes are hand-written. O'Mahony et al. (2014,p.3) found that in the manual records management, nurses were concerned about illegible hand writing that could results in wrong medication being prescribed to patients. Hence, the public hospital

management emphasized the use of the EHR system as it minimizes the risk of interpreting wrong information due to indecipherable writing.

The public hospital management exposed that at times doctors are challenged by the EHR system interface as they have different ways of doing things. Noticeably, poor user interface obstructs with the way doctors treat patients and it results to discrepancy health records creation. On the other hand, patient administrators revealed that the system interface allow them to easily do their duties with no file duplication and reduction of paper use. The public and private hospitals further established that the EHR system effortlessly allows easy consolidation of static reports correctly and efficiently. Accordingly, it is for this reason the eHealth Strategy of South Africa (2012-2017) promoted the use of electronic health records system in order to improve data quality and reporting. Health System Trust (2015,p.1) posited that the essential element of utilizing the electronic health records system is to be able to produce information that stakeholders in the health sector can utilise to make transparent and evidence based decisions to develop health interventions. Mpofu (2014,p.4) affirmed that the use of EHR system improves data accuracy and quality in health organisations and promote correct reporting. O'Mahony (2014) affirmed that the EHR system do have the potential to calculate monthly statistics and it reduces workload to healthcare employees. Thomas (2016, p. 25) also established that data collected in health institutions through the use of EHR system, clinical outcomes can be improved (Thomas, 2016, p. 25).

In addition, the nurses and doctors in the public hospital confirmed that the use of EHR system allows easy schedule of future appointments for patients, including tracing health progress, prescribing medication and reviewing previous treatment. Unlike in the public hospital, the private hospital only schedules future referrals using the EHR system, in order to track patient progress files, need to be requested from offsite storage. These result clearly showed that the private hospital is not benefiting much in the use of health information. The private hospital also disclosed that the system permit users to identify patients admitted in wards, numbers of beds available and taken, patients discharged and transferred. The private hospital additionally confirmed that electronic medium allows the hospital to control patient's records with limited access. Marutha and Ngulube (2012,p. 42) found that the formulation of patient's summary on referrals, retrieval of information, auditing process of clinical information is rapid when using the electronic system in some hospitals in the Limpopo province

The users in the public hospital revealed that the electronic health records systems save time, decrease patient waiting time, and increase time for patient care. In the private hospital, revealed that patient data can be stored without echoing the process and it encourages time management. The public hospital also revealed that they have existing recovery plan in case of disaster occurrences. In the private hospital, the study discovered that there is no recovery plan the hospital is cognisant of in case of disaster to the original physical files stored offsite, except copy-scanned files on the system used for retrieving patient's history. Both public and private hospitals indicated that no user can modify patient records and all records are kept in their state of originality. The survey clearly showed that both public and private hospitals benefit differently from the system, and that the hospitals use the system for different reason. The results infer that both hospitals are benefiting from the use of the EHR system, however, the private hospital need to implement the system fully to benefit more.

5.4 MONITORING AND EVALUATION OF EHR SYSTEMS IN HOSPITALS

One of the objectives of the study was to examine how public and private hospitals monitor and evaluate the impact of EHR system execution. The eHealth Strategy of South Africa (2012-2017) promotes continual evaluation of eHealth initiatives and measuring improvements of expected outcomes in order to generate evidence-based demonstration of eHealth benefits for future planning and decision making. IRMT (2009, p. 63) specified that any active electronic management system must be monitored on a regular basis, in order to understand the malfunctions of the system. The sub-themes are discussed below:

5.2.1 Control plans to measure success or failure of EHR systems.

The electronic system is intermittently controlled and assessed in order to determine how it can be made more efficient and effective (IRMT, 2009). Control plans are methods utilised to promote and ensure quality standards in the use of the EHR system in order to achieve anticipated outcome. The current study revealed that the public hospital control effectiveness of EHR system using penalty regime set for EHR system providers. The penalty regime emboldens agreement and compliance on EHR system providers to promptly respond on challenges (calls logged) encountered by users while utilising the system. The public hospital further revealed that when the IT Company does not respond to queries logged by users on time the IT company forfeits certain amount of money to be remunerated to them. The study further revealed that monthly-based penalty reports are drawn from footprint in order to analyse the performance of the EHR service providers in the public hospital. The study established that,, penalty regime seems to works in the public hospital's favour as the EHR system service

provider promptly attends to all EHR system-related matters in time and not willing to make any financial loss. IRMT (2009, p.26) posited that performance of any contractor responsible for the electronic system needs to be controlled and continuously reviewed on a regular basis, and contract agreements are updated to reflect changes in requirements.

Furthermore, the public hospital further revealed that regular meetings are held with the IT private company discussing indiscretion brought by the system. Similarly, the private hospital conducts regular meetings where transgression and statistic reports are discussed, including common challenging trends and report back to the head office. This result clearly showed that the public hospital have a voice in success or failure of the EHR system. The public hospital directly engages with the EHR service providers as compare to the private hospital where they liaise with hospital head group. The study settled that the private hospital operates differently to the public hospital. Furthermore, the private hospital revealed that, control plans are based on the objectives of the system set by the hospital head group. However, the hospital uses time variance spent on the system including time spent with patients as an indicator to measure success or failure of the system. Erasmus and Van Der Walt (2015) reported patient waiting time as an indicator when evaluating the EHR system. Stravers (2015) also concurred that time spent retrieving patient information form part of evaluating EHR system effectiveness. IRMT (2009, p.80) suggested developing performance indicators as another way of measuring and evaluating change. The study established that, the private hospital does not have standalone formal measures in place to monitor the system as all their processes are head office driven.

The private hospital also revealed that incident reports communicated by the hospital head office assist to monitor and track effectiveness of the system. The incident reports specify hospital site and services affected at that particular time. The study establishes that the private hospital does not have any contribution in control plans to measure effectiveness in the use EHR system, as all detailed information concerning the electronic systems derive from the hospital head office. The study indicated that that private hospital is not fully electronic in managing patient records, however, evaluates scanned files against physically stored offsite files using checklist. Su et al. (2006) also emphasized that accuracy in patient documentation merged with an EHR system must be utilized as form of control plans. The private hospital further revealed that random visit to the offsite storage forms part of monitoring and evaluation plan to measure work progress. Marutha (2012) accentuated that it is vital to develop recurrent formal procedures for monitoring and auditing of electronic records systems. However, the author did not specify the indicators guiding the monitoring and evaluation process. Erasmus

and Van Der Walt (2015) additionally posited that transition requires recurrent monitoring and evaluation.

The current study establishes that the public hospital have monitoring and evaluation processes in place, however depends on the IT company as hospital does not have the hospital standalone formal monitoring and evaluation plan. Similarly, the private hospital evaluation processes are done at the hospital head office. IRMT (2009,p.79) emphasized that it is important for hospitals to conduct frequent monitoring, evaluation and performance measurements in order to identify success or failure of initiatives implemented as to when and how advancement needs to be made to attain anticipated outcome. Thomas (2016) opined that continuous monitoring enables the implementers to assess if there is any necessity for adjustment.

5.2.2 Monitoring productivity in the use of EHR systems.

Monitoring offers a means to track progress and ensure users are productive in the utilisation of EHR system, and it forms essential part of change management. According to Kamadjeu (2005), monitoring the use of EHR system ensures immediate response to challenges facing users in utilization of the system. The study revealed that both public and private hospitals use discrepancies found son data captured in the EHR system to monitor staff productivity, compliance and track users struggling with the system. The study further revealed that number of trending cases reported or issues logged by users are also utilised to monitor productivity in the utilization of the EHR system. Furthermore, the study revealed that EHR system used in the public hospital generates error reports for the hospital management to monitor users' productivity. In the private hospital, the EHR systems is monitored through detailed incident reports sent via email by head office. Unlike in the public hospital, the private hospital head office only focuses on the EHR system infrastructure and efficiency not on users' productivity in the use of the system. Moreover, the reports produced also support hospital management into decision making in improving the system. Thomas (2016, p.55) found the use of health information technology in primary healthcare offering multiple operational services including producing reports that can be utilised to analyse cost centres and shortage of resources. IRMT (2009, p.82) concluded that the use of the electronic records system is essential in ensuring successful training.

The public hospital additionally revealed that the number of patients who received medical attention is used to measure staff productivity and it used as an indicator for processes that need to be amended. Furthermore, the system allows the hospital to monitor the workflow from

number of patient in the waiting area to patients attended, discharged and admitted, each department is able to track people performing their task and those who not. In the current study, time variances spent by health care practitioners assisted hospitals to assess users' productivity. Thomas (2016, p.55) found that a Pretoria clinic monitored productivity based on patients in the waiting area. The public hospital management revealed that case and user studies are utilised to measure effectiveness of EHR system. The public hospital revealed that due to effective monitoring in the use of EHR system, different hospital around the country benchmark the system in place. Berhe et al. (2017) monitored the effectiveness of EHR systems utilizing users' studies in Ethiopia referral hospital and found that usage of the system was highly favourable to the hospital and users were satisfied with system in place. Health Design Authority (2012) underlined benchmarking as one of the fundamental tools to assess capabilities of EHR system in hospitals including impact studies in the use of the system. The study established that the public hospital monitors EHR system efficiency and users' productivity, while the private hospital only monitors the system.

The private hospital indicated that through audit trail, the hospital is informed if the system is failing or users are strolling with the system. It is necessary to conduct audit and measure performance to help the organisation achieve its objectives (IRMT, 2009, p.18). Meanwhile, involving external and internal auditors with strong basis of health profession and EHR system is another best form of evaluating system effectiveness (Health Design Authority, 2012). Studies by Luthuli (2017), Marutha (2011), Pyrene (2015) and Katuu (2015), Thomas (2016) and Weeks (2013) focused on medical records management and the use of ICT and supported the evaluation of health records, however, there is currently limited literature supporting the monitoring and evaluation of EHR system. Noticeably, the eHealth Strategy of South Africa (2012-2017) highlighted the importance of monitoring and evaluation as a priority, without notable supporting national framework and processes guiding the implementation of electronic health records systems. According to Health Design Authority (2012), literature review offers healthcare organisations with published work of knowledge, trending topics relating to EHR system national and international supporting the monitoring and evaluation of the system. In the same vein, formative evaluations are built on strong change management approach (Canada Health Infoway, 2013); but both hospitals have no officialised monitoring method, and they simple do what is working for them at that particular time.

5.2.3 Statement on the manner the use EHR system to improve users work

The implementation of electronic health record systems in hospitals is industrialised to improve employee's (users) workflow simultaneously encourage and promote health service delivery. The study sought to find out the manner in which the use of EHR system improves users' daily tasks. In terms of the rankings scored, findings indicated that the system keeps information up to date in the public hospital with high score of 90 (90.9%), and similar results obtained in the private hospital stood at 43 (58.1%). Furthermore, both hospitals established that the EHR system provides hospitals with accurate health information with the score of 70(70%); from which public hospital has 44(59.5%); and private hospital with 44(59.5%). Only the public hospital has 69(69.7%), thus confirmed that the EHR system provides complete information at a point of care. Both public and private hospitals revealed that EHR system promotes easy communication among health personnel. The study establishes that the EHR system is effective in the public hospital, while the private hospital only benefits from the portion of implementation already active, as the EHR system is not implemented. Luthuli (2017, p.140), Marutha (2011, p. 173), Moomba (2017), and Pyrene (2015, p.131) also found that hospitals do not use all the modules in the electronic records management system and the implementation is incomplete.

5.2.4 Feedback given by the hospital on the effect of using EHR system

The purpose of monitoring and evaluating is to assess and track outcome anticipated, with the aim to improve impact and future output. It is for this reason change management must emphasize giving feedback more often to users utilizing the HER system. The study revealed that users do not receive feedback on the effect of utilizing the system, as confirmed by 59 (59.6%) of the users in the public hospital, and 48 (66.9%) in the private hospital. The study established that both public and private hospitals overlook giving feedback to users. These results showed an imbalance in the change management practice as the hospital could miss preventable challenges in the use of EHR systems. Kotter (1995) posited that it is essential to break down small wins during the implementation phase and give feedback on the short wins accomplished; therefore, this involuntarily allows the hospital to know the challenges in the implementation. Pryor (2008, p.11) encourage leaders to regularly look for short wins and give feedback to the organisation to encourage additional change and more constructive progress in the system implementation.

5.5 TOOLS USED BY HOSPITAL MANAGEMENT TO REINFORCE CHANGE AND SUSTAIN RESULTS IN THE IMPLEMENTATION OF EHR SYSTEM

The establishments of ICT in records management necessitate proceeding through series of structured steps in the utilization of officialised accepted tools by the organisation and techniques used in system development (IRMT, 2009, p. 3). Crucially, tools are constructed to promote, reinforce changes and sustain results of the EHR system implementation. Pryor (2008, p. 11) emphasized that change should be reinforced and continuously evolve to fit the needs of the organisation. It is essential for hospital leadership to take charge of strengthening the implementation and operation of the EHR system for meaningful use. The study presents findings on the objectives based on tools utilised by hospitals in reinforcing change and sustaining results based on the following:

5.5.1 Tools and plans to reinforce change in public and private hospitals

According to the World Health Organisation (2018), hospitals need to prepare themselves to meet the changing healthcare environment demand. However, any organisational change is dependent on the effective tools and plans set by the management. Both public and private hospitals management revealed that strong communication via emails, and structural meetings are tools used to reinforce changes that comes with EHR system implementation. Health Quality Ontario (2013, p. 6) asserted that good communication allows organisation to share knowledge, norms and values, develop trust and strong emotional stability.

The public hospital mentioned demo recalling, and handbooks amplifying necessary workflow steps as another tools used to understand adjustments or improvements made in the system. On the other hand, the private hospital revealed that different departments print out notifications sent by hospital head office and paste on notice boards to ensure users are alert and internalize changes to take place. The private hospital further established that the head group runs the change management logistics including major system modification, upgrades and training. For all changes taking place, the hospital head group pass information to the systems controller, who is accountable for training users in different hospital departments. The study established that, the private hospital does not have standalone internal tools used to reinforce change as every directive derives from hospital head group. Health Quality Ontario (2013, p. 9) noted that system sustainability is accomplished when the new ways of working improve and becomes a norm in the organisation. The study further established that the change management initiatives in the public hospital is the responsibility of the IT company (EHR service provider)

not the hospital management. The study by Weeks (2014, p.112) found that the vendors were responsible for EHR design, implementation and respective change management initiatives in the Pretoria clinic.

Noticeably, both hospitals public and private hospitals emphasised on the involvement of users in strengthening support of changes made on the system. Both hospitals mentioned intensive training as one of the fundamental tools in making sure the hospital respond positively to changes. The public hospital mentioned that users start with computer literacy training prior to EHR system training, and certificate is awarded after each training in order to encourage, and cultivate in them the habit of learning about the system. The study established that training in the private hospital is not highly prioritised compare to the public hospital as users learn by observing others. This finding of the study showed that private hospital does not provide thorough training for it is users, as they do not develop users' computer skills prior to EHR system training. The researcher observed that often, nurses in the private hospital needs constant support in utilizing the billing system from super users. Study by Erasmus and Van Der Walt (2015,p.187) reported that using computer every day does not constitute being a computer literate as users learn to do their jobs using the system by observing others and if it happens, they lend themselves in the wrong menu where they were unable to rectify their mistakes. Erasmus and Van Der Walt (2015, p.187) accentuated having false sense of computer literacy skills can be too challenging for the EHR system operation.

5.5.2 Training provided by hospital to employees in using EHR systems

The respondents were asked if they received any special training in using EHR system. The study revealed that compulsory computer literacy course is provided to every employee hired in the public hospital. The computer literacy course is offered to ensure users are prepared for EHR system training that conducted based on users' respective duties in the public hospital. The hospital management emphasized that no users are allowed to consume duties in the hospital without thorough training. The public hospital revealed that the IT company conducts computer training on EHR system. The EHR system service provider liaises with different departments within the public hospital. The public hospital further revealed that workshops are conducted to promote and encourage the use of the system including additional training also provided on request.

Meanwhile, the private hospital revealed that the head office group provides intensive training to the systems controller and super users chosen from different departments in the hospital. The

private hospital revealed that people from head or regional office come to the hospital premises and provide theory and practical training. This was mentioned by the management and confirmed by the users. In addition, the private hospital management revealed that system's controller conducts induction and passes information to different departments with assistance of super users; and how other users more especially nurses get trained. Marutha and Ngoepe (2017, p. 5) also found that in-house training was provided in Limpopo hospitals but conducted by internal staff unevenly. The system users in the private hospital complained that the private hospital lacks refreshment training. This finding established that the private hospital does not provide thorough training for all users utilizing the system as compared to the public hospital. Yehualashet et al. (2015, p. 19) emphasised on the importance of computer literacy and EHR system training to the attitude and use of the EHR system. The private hospital does not ensure all users have computer skills prior to utilization of the system in place. The private hospital needs to learn from the public hospital the way training is offered to their users. Tubaishat (2018, p.9) suggested basic computer skill training to enhance and prepare users in the utilization of the EHR system. Thomas (2016, p.69) found that basic computer training needs were addressed first, and followed by training on the system in primary healthcare in Pretoria.

The study found that users from both public and private hospitals were not offered records management crash course, yet they deal with patient records every day. Marutha and Ngoepe (2017, p.6) reported that majority of officials in the Limpopo hospital also did not attend formal record management training as it was no offered to staff, and this is similar to other findings from the current study in both hospitals. Furthermore, Marutha and Ngoepe (2017,p. 6) stated that it is necessary for employees in the hospital to be capacitated with knowledge and skills to develop maintain the records management programme. Additionally, training sessions provided to users' needs to be well planned, effortlessly implemented, and thoroughly evaluated (IRMT, 2009, p.79).

The researcher observed another challenge facing hospitals as regards training is the high turnover of students, volunteers or temporally workers who come and go; and thereby complicates training, as larger number of staff always require training recurrently. Erasmus and Van Der Walt, (2015, p.187) reported similar results of temporary students and temporally worker's as challenge to the hospital training. The study by Weeks (2014,p.114) found that the clinic using the EHR system serves as training institute for University of Pretoria students and each new intake needs to be trained on the EHR system which results to unending training process. To Keakopa (2013), capacity building including training and staffing was a major

setback during implementation phase in Botswana certain. Thomas (2016) also pinpointed that when changes occur, it is necessary to identify training needs of the staff and resources required for efficacy.

5.5.3 Change management policies and procedures in the implementation of EHR systems

The implementation of electronic records management cause inevitable changes in organisational responsibilities, policies and procedures (IRMT, 2009, p.75); hence, the integration of ICT systems in records management must be regulated (IRMT, 2009, p. 3). To the IRMT (2009), it is compulsory to have laws, governance, strategies and evaluation mechanism in place to provide compliance framework to ensure records management requirements are included in the ICT system. According to ISO 15489-1 (2001 section 6), organisations should "establish, documents, maintain and promulgate policies and procedures" to ensure that "when business need evidence and accountability and information about activities are met". In South Africa, creation and maintenance of electronic and manual records is primarily guided by the National Archives Records Services of South Africa (NARSSA). Therefore, the study sought to establish change management and procedures in the implementation of EHR systems.

The survey revealed that the public hospital has information technology policies and procedures in place guiding the electronic health records systems combined with change management guidelines for any introduction or modification of software. The hospital also has existing protocols in place is normally followed for system changes, testing and backup plan. In addition, change control reference numbers are utilised in the public hospital for any system modification with detailed of change implemented. The hospitals also comply with the standard operational procedure that are updated on regular basis, aligned with the Department of Health. The public hospital further revealed that they also have downtime procedures in place in case the system is down at a particular time including registration procedure, disposal of confidential information policy and acceptance computer use policy.

The private hospital revealed that change management policies and procedures in all electronic systems is mainly the responsibility of the hospital head group and available in the hospital company intranet. Both public and private hospitals indicated that change management procedures include meetings and upfront discussions with different committees prior to changes taking place. Both public and private hospitals revealed they have in-house policies

and procedures in compliance with Promotion of Access to Information Act 2 of 2000, Protection of Personal Information Act 4 of 2013 and National Archives of South African 43 of 1996. The study further established that existing policies and procedures mentioned by both public and private hospitals only drives change management of the system not creation electronic health records. It is significant to document change processes carried out during pre and post implementation, in order to develop initiatives contributing to the establishment or improvements of records management policy and compliance (IRMT, 2009).

The findings of the study affirmed that there are no standard guidelines for both public and private hospitals in establishment of policies guiding change management in the implementation of EHR system in hospitals. Crucially, EHR system is managed based on what work for each hospital with acknowledgement of legislatives. Katurura and Celliers (2018, p.4) found that EHR systems were not developed on common grounds and unclear guidelines were also enabling sharing of information and resources. The authors further reported lack of insufficient developments of standards and framework in the implementation of EHR system. Marutha (2011) agreed that there is lack of policy framework in the management of medical records. In another instance, South African Health Review (2007) confirmed that legislation and polices guiding health information technology is imprecise. Marutha (2018) indicated that it necessary for existing legislatives to be reviewed to accommodate changes that comes with technology development in records management. Luthuli (2017) also emphasised that stakeholders should be mindful of the regulatory framework governing their work and highlighted that legislatives in the implementation of ICT is work in progress. Legislation framework governing EHR systems can help in enhancing acceptance of the system (Katurura & Cilliers, 2018, p.4).

5.5 CHANGE MANAGEMENT PRACTICE IN THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS SYSTEM IN PUBLIC AND PRIVATE HOSPITALS IN THE ETHEKWINI AREA

The adoption and benefits of electronic health records system is attainable utilizing integrated approach of change management (Canada Health Infoway, 2013, p.11). Managing change is essential in establishing and maintaining effective electronic records management system successfully (IRMT, 2009,p.82). Importantly, change needs to be well understood and managed in a manner that people affected can cope with it efficiently (IRMT, 2009). Additionally, change management practice in the hospital setting needs to compliment the

intention of utilizing the EHR system. Any organisation that has clear processes in the implementation of electronic records management systems and involving people (users) tends to master the change management practice without realizing and documenting it. This objective sought to focus on the current change management practice in public and private hospitals, giving insight to the hospital management and users in the implementation and operation electronic health record system.

The summary findings are discussed below:

5.6.1 The use of EHR system in public and private hospitals

As indicated in Chapter four of the current study, effective change management plan results to users knowing the intended intention to utilise the system. When the anticipated outcome of system usage aligns with the intention to utilise the system, change management practice becomes visible. Vitari and Ologearu -Tadder (2018,p.4) stated that readiness in the utilization of electronic health records systems plays an important part in reducing resistance, meaning it increases intention to use through visibility of change management in the implementation process. According to Surendran (2012), intention to use is dependent on the likelihood a person employs the system implemented.

The current study assessed the probability of users continuing to utilise the EHR system, and the findings revealed that 87 (87.66%) s overall total of the users in the public hospital were willing to continue using the EHR system, with 46(75.68%) of the users from the private hospital. The survey also revealed 88(88.89%) of the users in the public hospital intended to utilise the system for their daily duties, including 60(81.08%) in the private hospital. The findings further revealed that these users were willing to frequently use the system even in the near future, this was confirmed by the combined score of 68 (68.68%) in the public hospital and 59(79.73%) in private hospital. Additionally, 87(87.87%) users in the public hospital and 60(81.08%) from public hospital established that they will definitely recommend the use EHR system to others. These findings from public and private hospital fully reveal that users comprehend the benefits of utilizing the current system. Similarly, the study established that users from both hospitals showed readiness to use of EHR system despite few individuals who were uncertain. Earlier study conducted by Kwahk and Lee (2008, p.49) based on empirical validation found that behavioural intention to utilise ERP system was indirectly affected by the

by readiness to change. The EHR system although has been attempted for a very long time in South Africa, not many studies have been done to measure the intention to use EHR system.

5.6.3 Management of change in EHR systems in hospitals

Any public or private organisation with change capacity has a duty to develop change management policies and procedures. According to ISO 27001 Forum (2010, p.3), adopting formalised governance and policies delivers a more disciplined and efficient infrastructure. The current study sought to find out strategies in place to manage changes in the EHR system implementation in public and private hospitals. The current study revealed that both hospitals used communication platforms as strategies and approaches to manage EHR systems. The public hospital revealed that hierarchal meetings are regularly held discussing maintenance plan, system changes and upgrades. Unlike in the private hospital, the private hospital revealed that the hospital head group handles the approaches and practices of managing EHR systems. However, the private hospital emphasised on the importance of projects planning, concept design, bench marking prior to project implementation, and receiving feedback from system users as essential part of change management strategy and results to meaningful use of the EHR system. The study revealed that the private hospital has a call centre responsible for responding to EHR system queries and provide manual detailed guideline on the system. On the other hand, the public hospital revealed that refreshment training are offered to employees who took some time out of the system due to long term sickness or study or maternity leave, that another strategy of ensuring that everyone keeps up with system changes. Again, the public hospital revealed that monthly generated reports from ICT department also assists the hospital in tracking changes and finding solution of managing challenges. Both public and private hospitals revealed that getting strong buy in from users as an essential part of managing changes including involving staff in discussions and decision making overcoming challenges. Weeks (2014, p.115) found change management approaches at Pretoria clinic in form of series conversation with the users.

The public hospital revealed that whenever there are system changes to be executed; pilot or testing phase is done with few sampled departments prior the actual execution to ensure successful implementation. Furthermore, recycling equipment including software, hardware after a certain period is also regarded as part of change management approach initiatives. The private hospital revealed *post* implementation review, continuous monitoring, and evaluation ensure functionality of the system, helps to anticipate outcome, and it is not out of scope

including post implementation review. IRMT (2009, p.75) mentioned that change may be perplexing, hence, people responsible for managing change need to provide stability using settled approaches, giving support to staff members as they learn new ways of doing their duties. The study established that both public and private hospitals have different approaches of managing changes in the implementation of EHR systems with no standardised guideline for policy procedural development. Therefore, this presents negligent in change management practice in the implementation of EHR systems, resulting to hospitals not handling EHR system changes effectively, and thus causing confusion to the users. However, policy development and procedural manual in records management is guided by NARSAA (2007) in the public hospital and NHCSA (2003) in the private hospital. Therefore, these guidelines only focus on records management and side-line change management in the implementation of electronic records systems. Luthuli (2017, p. 126) confirmed that it is necessary to consistently keep up with records management standards and practice in the country.

5.6.2 Communication in the use of EHR systems

It is important to ensure that information about organisational change is circulated effectively and comprehensively through frequent formal or informal communication with staff members (IRMT, 2009, p. 76). Communicating the vision consistently throughout the transformation process leads to positive outcome (Kotter, 1995). The study evaluated form of communication utilised to ensure vision of EHR system is clear in both public and private hospitals. This was conducted to get an insight as to whether hospital management institutionalises change and sets tone for everyone to realise change visibility in order to accommodate dissimilar users performing disparate duties. It in this regards communication channels form an integral part of change management in the implementation of electronic health records systems.

The public hospital revealed that structural steering committees are the greater essential platform for user for ensuring clear vision of utilising EHR system is communicated, from top, middle and lower management including IT private company. The private hospital revealed that communique is mostly derive from the head office, disseminated to senior managers, than unit managers, and pasted on notices board for users. The private hospital established that continuous meetings concerning the use of the system are held with doctors. However, the hospital management revealed that it is difficult to set meeting with doctors as they work based on their individual time frame. Both public and private hospitals revealed that end users meeting are also conducted; allowing users to verbal communicate their experience about the

system. Therefore, this also gives hospital management insight of what is happening at the operational level. IRMT (2009:77) posited face-to-face communication as one of the best forms of stimulating change acceptance in the use of electronic records systems; however, other methods are also commendable. Both public and private hospitals revealed that email circulation including signatures and banners are another tools used to communicate with different hospital users. However, the private hospital highlighted that nurses are not much exposed to emails, as they do not interact with computer systems often. Therefore, newsletters attached to nurse's payslips is another form of reaching out to them. This result clearly indicated that the private hospital does not encourage its nurse to use emails.

The researcher also observed that the public hospital also uses television screen to display promotional information about EHR system processes. Respondents from the public hospital also revealed that flyers also guide patients with information while waiting for patient care. IRMT (2009, p.76) recommended workshop as another operative manner of giving staff insight and reinforces them to commit to procedures. Both hospitals revealed gateway or intranet as communication tool that contains all policies and procedures. IRMT (2009,p.76) viewed intranet, departmental or team meetings, staff induction, newsletter including staff related gathering as the greatest opportunity for communicating, dissemination or sharing of relevant information. Kotter (1996) recommended the use of different of communication; replicating the information many times as possible whether it is formal or informal.

The findings of the study showed that both hospitals do have different communication channels in place in ensuring EHR system is visible and promoted. However, each hospital does what accommodates their users. The study established that the public hospital is more devoted into engaging with users from different levels as compared to the private hospital. Accordingly, Kotter (1996) argued that; in most instances communication in the organisation is not effective due to minimum effort devoted to that exercise. The author further elaborated that often times, it is assumed that the vision and plans from the top management or change agents presented can be clear and easily processed to the rest of employees without their views and input, but backfires due to inadequate communication and transparency. IRMT (2009, p. 76) also recommended staff survey as another effective communication tool for gathering, evaluating issues in order to ensure concerns can be openly addressed as part of the change management process.

5.6 SUMMARY

This chapter discussed and interpreted data presented based on findings of the previous chapter. The interpretation and discussions were aligned with themes derived from objective of the study and research questions responding to the eHealth Strategy of South Africa that was formed to guide the implementation of electronic health records systems. Relevant literature from global, Africa and particularly South Africa contexts were sought to validate various findings. The study confirmed that both public and private hospitals do experience various challenges; and one of the shortcomings is lack of records management components in the use of ICT in the private hospital. The study further confirmed that there is no notable officialised monitoring and evaluation methods guiding these hospitals' in the implementation of electronic health records systems. The study affirmed lack of standard guidelines for both public and private hospitals in the establishment of procedures and policies guiding change management in the implementation of EHR system. Furthermore, this study showed communication breakdown and inconsistency in the manner in which the hospital management engage with users in both public and private hospitals regarding EHR systems. It further confirmed poor users' involvement in the execution of EHR systems. Therefore, this results to imbalance in change management visibility in the implementation of EHR system as hospitals struggle to track effectiveness of the system and user acceptance. The finding also revealed insufficient standard procedures for monitoring and evaluation of EHR systems. The study also looked on tools used to reinforce change in hospitals including training provided to users in the utilisation of the EHR systems. Lastly, the study discussed effective change management practice in the implementation of electronic health records systems.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

6.1 INTRODUCTION

The previous chapter focused on findings and discussion. This chapter presents summary of findings, conclusion and recommendations of the study based on the data analysis and interpretation of results presented in chapter four and five. This chapter provides insight on change management practice in the implementation of electronic health records systems in line with the research objectives of the study.

6.2 SUMMARY OF THE FINDINGS OF THE STUDY

The summary of the study is aligned with the research objectives addressing change management in the implementation of electronic health records systems in public and private hospitals.

6.2.1 FACTORS FACILITATING THE ADOPTION OF EHR SYSTEMS IN PUBLIC AND PRIVATE HOSPITALS

The first objective of the study was to determine factors facilitating the adoption of EHR systems in public and private hospitals; and the following were the findings:

(a) Both public and private hospital are motivated by common factors in the adoption of electronic health records systems namely: minimisation of patient waiting time; prevention of the duplication of patient files, avoidance of misplacing, missing or loss of patient files, accurate statistic reporting, and easy communication between health personnel including patient referral. Therefore, these factors form part of the problem statement stated in the eHealth Strategy of South Africa (2012-2016) that sets to improve health service delivery.

(b) The public hospital has adopted the use of EHR system for patient administration purposes, patient care, and records management activities, while the private hospital mainly used it for patient admission, capturing patient personal information, billing and stock control for pharmacy

(c) It easy for the public hospital to consolidate and retrieve patient files using the EHR system, while the private hospital is experiencing slow retrieval due to the length process used retrieving files from offsite storage. The private hospital also opens new

files for each patient visit resulting to challenges in file consolidation and this negatively affect the retrieval process as one patient have multiple files

(d) Majority of nurses in the private hospital revealed that the system does at times limit patient care as it occasionally freezes. In that case, they still make use of manual recording for certain activities such as recording patient information, nurses and doctors notes.

(e) The private hospital outsourced electronic records management services; the commercialised record management company scans patient files. Only one person has access to the software used to store patient scanned files.

(f) The private hospital uses multiple systems for different hospital activities and there is no unified use of EHR system like in the public hospital.

The study further assessed the application of change management processes in the implementation of EHR systems in both public and private hospitals. The study established that:

(g) Both public and private hospitals acknowledged and comprehended the importance of change management in the implementation of EHR system.

(h) Change management process in the private hospital is mainly the responsibility of the head office as changes since the entire hospital group is affected; while in the public hospital, the Management and the contracted IT Company is responsible for change management in the execution of EHR system.

(i) Users in the public hospitals are usually mentally prepared and ready six months prior to major changes taking place to avert change resistance; while users in the private hospital only get to know about system changes implementation is communicated from the Head Office.

(j) The public hospital revealed that change management prepare the hospital to avoid same challenges occurring in the near future; while the private hospital ensures that the electronic system is well received and understood by users.

(k) Change management helped both public and private hospitals to raise awareness and employees buy-in regarding the use the EHR system.

(l) Unlike in public hospitals, change management in EHR system allowed the private hospital to easily identify people willing to adopt to changes implemented and

determine super users who provide support to their peers when encountering challenges using the system.

(m) In terms of communicating the vision of using the EHR system, both public and private hospitals did not constantly communicate the vision of utilising the EHR system. This results in users not to getting much involved in the discussion of changes in the system implementation.

(n) With regard to hospital management sharing reasons on changes in the EHR systems, the public hospital employees confirmed that the hospital management never share reasons for EHR system modification, and a very few individuals get to know detailed information. Similar results were obtained in the private hospital.

(o) In terms of the involvement in the of EHR systems implementation, the majority of nurses and doctors confirmed to be involved while patient administrators, file and ward clerks were not involved. The following should be noted carefully:

- The public hospital management validated that various departments including nursing unit, information technology unit, systems management, human resource, case management, including information technology division liaise with the IT company appointed to run the EHR system. On the other hand, the admission department complained that they not much involved and willing to take part should the opportunity present itself.
- While the private hospital users (nurses, doctors, patient administrators, filing and ward clerks) were not involved in the execution process, the hospital head group does everything concerning the implementation process of the EHR systems, and the private hospital only gets to be involved if selected for piloting purposes that the only manner they get to be involved. The study discovered that there is one systems controller, who is the linkage between the private hospital and head office responsible for technical related issues.

(p) With regards to support received from the Department of Health, the private hospital revealed it does not receive any form of support from the Department of Health in the implementation and management of electronic health records system. Meanwhile the public hospital confirmed that the entire implementation process including system upgrades and maintenance of EHR system is fully supported financially by the Department of Health.

6.2.2 CHANGES EXPERIENCED BY PUBLIC AND PRIVATE HOSPITALS DUE TO EHR SYSTEM IMPLEMENTATION

This objective of the study was to assess changes experienced by the public and private hospitals due to EHR system implementation including upgrades, maintenance and operation. The study established that:

(a) Both public and private hospitals were aware about the use of EHR systems.

(b) The public hospital employed the system for capturing patient information, retrieving files, admitting, referring and discharging patience; while the private hospital use it mainly for capturing patient information, admitting, discharging patients and billing.

(c) In the public hospital records management activities were incorporated in the in the use of electronic health records system. While in the private hospital the billing system was a well-developed section in the use of electronic health records systems as it profit driven; records management activities were not prioritised.

(d) In terms of job restructuring in the implementation of EHR systems, the study established that there were no changes in their job description in the public hospital, however other users were uncertain about the system and preferred the old system. The private hospital also confirmed no changes, but nurses complained about additional work bought by the billing system. Therefore, the study found that users job changes without users realising.

(e) In terms of users' acceptance in the implementation of electronic health records systems, users from both hospitals affirmed to be familiar with the system. However, only users from the public hospital confirmed that the system enable them to do their jobs efficiently. While other users from the private hospital applauded the use of the system in carrying some of their duties, nurses were not happy with writing the manual patient chart. Therefore, it affected the manner nurses perceived the billing system, as they viewed it as a waste of time.

(f) The public hospital confirmed that the system allowed them to perform administrative duties, to access lot of information and effortlessly perform duties; while in the private hospital, only half of the users confirmed the same. The public hospital established that the EHR system improved service delivery, while in the private hospital; only half of the respondents confirmed that. Therefore, this shows that the use of the system does not benefit all users in the private hospital.

(g) Users in the public hospital perceived easy use of EHR systems, while in the public hospital, users particularly nurses in the private hospital lack understanding of how the use of the system is applicable to their duties, as it does not fit into their clinical and administrative duties.

(h) In terms users' attitude towards EHR system, both public and private hospitals considered using the system as the good practice, while users confirmed willingness to continue using the system for the best interest of their duties.

(i) Both public and private hospitals experienced challenges in the utilization of EHR systems as it mainly slows retrieval of patient records. However, the public hospital complained that the old system was better when it comes to retrieval. On the other hand, in the private hospital, the retrieval process in use was a lengthy process with limited access to the system linked to the outsourced storage where patient files are kept.

(j) Majority of nurses and doctors in the public hospital established that they have insufficient time interacting with patients, as they have to be attentive when capturing information while giving patient care. Furthermore, the billing system used in the private hospital freezes from time to time, resulting to nurses having limited time interacting with patients. In addition, there were limited charging points for billing screen monitors in the private hospital challenge nurses, resulting to inaccurate billing process causing conflict between patients and the hospital.

(k) The study confirmed that lack of connectivity and load shedding are other challenges experienced by the private hospital. Furthermore, user interface in the creation of electronic records occasionally resulted to data error in the public hospital. User interface at times did not meet users' requirements especially with doctors as they have different ways of treating patients the public hospital. The study revealed that not every data captured is stored by the system in the public hospital, therefore costs admission clerks to repeat the process for every patient's visit and intermittently increasing the waiting time.

(l) With regard to problems encountered in managing EHR systems changes; the public hospital revealed that companies developing and managing EHR systems software at times leaves the country then it becomes challenging for the hospital to manage system upgrades. As a result, this reinforces the hospital to move from one system to another while attempting to find system that is managed locally.

(m) The public hospital revealed that training becomes challenging when changing or upgrading the EHR system, as users resist change and demand to be well informed of

the sudden change. The study established that public hospital at times impose system changes to users without informing them. Both hospitals confirmed that certain problems are only realised when the system is already live.

(n) Storage capacity on the EHR system is a concern in the public hospital as the number of patients captured in the system increases. Therefore, from time to time, the system needs to be merged to keep up with changes of the new or existing patients are treated.

(o) Managing expenses of EHR system in the private hospital is extremely costly as all technological changeover are managed by the hospital head office, any modification done to one hospital and applies to the entire hospital group. Meanwhile, the public hospital is financially supported by the Department of Health even for the EHR system implementation.

(p) The private hospital revealed that implementation of EHR system is conducted in phases. Therefore, the hospital still makes use of the old system for viewing and transferring notes. The activation of the new system blocks users from accepting the new system. Unlike the private hospital, the public hospital only uses the old system to view old notes.

6.2.3 MONITORING AND EVALUATION OF EHR SYSTEMS IN HOSPITALS

This objective of the study was to examine how public and private hospitals monitor and evaluate the impact of EHR system implementation. The study established that:

(a) In the public hospital, the penalty regime is used to reinforce compliance on the IT Company in providing EHR system services and encourage prompt response to queries logged by users. On the other hand, the study found that the private hospital has no influence on control plans in the use of EHR systems as everything concerning electronic systems and change management is the responsibility of the head office.

(b) The public hospital management is able to monitor the EHR system from the back end, verifying if patient information is captured correctly and patients are admitted accordingly. The study revealed that the private hospital used time variance spent on patients and system as an indicator to measure system effectiveness.

(a) Both hospitals engaged in regular meetings and discussions of EHR system errors, indiscretion including common trending challenges experienced in the use of the system. Statistic reports were also used in the public hospital for decision making and in improving the system.

(b) Unlike the private hospital, the public hospital engaged directly with the EHR system service provide to discuss the way forward in the use of the system; while the private hospital revealed that control plans are based on the objectives set by the hospital head group, concrete monitoring and evaluation is also done at the hospital head office.

(c) The private hospital used detailed incidents reports communicated by the head office to track the effectiveness of the system, including systems down times. Similarly, the public hospital employed incident notification received from the IT Company and generate reports from the system to track effectiveness.

(d) The private hospital also engaged in random visit to the offsite storage where physical patient records are kept. Scanned patient records were also assessed against physical records using checklist.

(e) With regards to monitoring of productivity in the use of EHR systems. The study established that public hospital compulsorily conducted test after computer and EHR system training to measure capabilities of users in utilizing the system. On the other hand, the private hospital assumed that users can be able to use the system by observing others without computer training.

(f) Both hospitals used discrepancies on data captured as another tool to measure quality and compliance including tracking those users struggling with the system. The number of patients been given medical attention was also used to measure staff productivity in the public hospital and track processes that requires improvements.

(g) The public hospital used audit trial, case and user study to measure success or failure of the system, as other hospitals in the country are benchmarking the system used. On the other hand, the private hospital only use audit trial to know the effectiveness of the system.

6.2.4 TOOLS USED BY HOSPITAL MANAGEMENT TO REINFORCE CHANGE AND SUSTAIN RESULTS IN THE IMPLEMENTATION OF EHR SYSTEM

The study established that:

(a) The public hospital has strong tools and plans when it comes to reinforcing changes such as demo recalling and handbooks about the system, computer literacy courses offered to users prior to the actual system training including providing users with certificates after training. On the other hand, the private hospitals have tools in place such as circulating and printing notification received from head office and pasting information on the notice board.

(b) The public hospital completely switched off the old system that was used prior, when the new system was introduced, while the private hospital still uses the old system in correspondence with the new EHR system. Therefore, this makes it difficult for the hospital to cut off the old system, and to reinforce the new system to users.

(c) In terms of training provided to hospital employees, the public hospital offered in-depth training through IT Company from basic computer training to EHR system training offered based on users' respective duties. On the other hand, in the private hospital, one system controller is responsible for the all hospital employees offered training with assistance of super users. The private hospital did not ensure that users have computer skills before training them on the electronic systems. Furthermore, the private hospital lacks refreshment training resulting to users having negative attitude towards the system.

(d) With regards to change management policies and procedures in the implementation of EHR system, both hospitals have policies and procedures on the EHR systems based on what works for each hospital. The study revealed that, the policies that hospitals have and comply with only drive manual records management, and not the actual electronic records system.

6.2.5 CHANGE MANAGEMENT PRACTICES IN THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS SYSTEM IN PUBLIC AND PRIVATE HOSPITALS IN THE ETHEKWINI AREA

This objective of the study was to find out effectual change management practices in the use of electronic health records systems in supporting the vision of the eHealth Strategy of South Africa (2012-2016) set to lead developments of health information technology in healthcare institutions. The study sought to find out how public and private hospitals manage changes in the operation of EHR system to accomplish meaningful use of the system and sustaining results. The study established that:

(a) Employees from both hospitals had intention to use the EHR system. The findings revealed that users from both hospitals showed willingness to use the system, although, certain users showed that they need more orientation on the use of the system and the actual intention of using the system.

(b) With regards to managing changes in the operation of EHR system, the study revealed that public hospital held continuous meetings concerning EHR system maintenance, system

upgrades and changes. Recycling computer equipment (software and hardware) also formed part of effective change management approach in the public hospital. Unlike in the public hospital, the private hospital head group handles the approaches and practices of managing changes in the use of electronic medium.

(c) The private hospital further revealed that call centre is also another tool used by the head office to attend electronic system queries. The private hospital also emphasised the need for continuous monitoring and evaluation of EHR systems when system change are made to ensure that the system still serve the purpose. The private hospital further revealed that there is a need to build strong buy in from users to easily overcome challenges that come with the use EHR in the hospital.

(d) In terms of forms of communicating clear vision of operating EHR systems, the study established that both hospitals used different platforms for communicating. However, meetings, emails, gateway and intranet are mostly used by both hospitals. The study confirmed that nurses were not exposed to emails hence notice boards were used as the main form of communication. Furthermore, in the private hospital, all communique about the system emanated from the head office.

6.3 CONCLUSION OF THE STUDY FROM THE FINDINGS

The conclusion of the study is based on major findings of the study in with the objectives.

6.3.1 FACTORS FACILITATING THE ADOPTION OF EHR SYSTEMS IN PUBLIC AND PRIVATE HOSPITALS

Concerning the factors facilitating the adoption of EHR system, the study concluded that:

(a) Both public and private hospitals had common sense of urgency in adopting the EHR systems in order to improve health service delivery.

(b) The public hospital fully implemented electronic health records system. On the other hand, the private hospital did not use the electronic systems for records management activities as patient chart, nurse and doctor's notes are still recorded manually.

(c) Consolidation and retrieval of files using the EHR system in the public hospital is effortlessly as compared to the private hospital. This is due to creation of new file for every patient visit resulting to unmanageable consolidation patient files.

(d) The system limits patient waiting time in the private hospital as the billing system sometimes freezes.

(e) The public hospital has unified system for hospital processes while the private hospital use multiple systems for different hospital activities including records management.

With regards to the application of change management processes in the implementation of EHR system. The study concluded that:

(f) Both public and private hospitals understand the significance of change management in the execution of EHR systems.

(g) The IT company appointed for EHR system implementation in the public hospital covers the scope of change management; while in the private hospital, the head office is responsible for change management task as any adjustment on the system does not only affect one hospital, but the entire hospital group.

(h) It easy for the public hospital to prepare for changes to take place as they have strong influence on preparing users for changes. In the private hospital only get to know about changes when the system is about to be implemented and all change process are head office driven.

(i) Both hospitals revealed that change management allowed comparison of challenges in the use of EHR system to avoid future occurrences.

(j) The study findings revealed that change management assists hospitals to raise awareness on EHR system, in order to get support from employees and identify super users in order to help other users struggling with system.

(k) As regards to communicating the vision for using EHR system, the study revealed that both public and private hospitals inconstantly communicate the EHR system vision resulting to users not being involved in the implementation process.

(l) The study revealed that both public and private hospitals never share reasons for EHR system changes.

(m) With regards to involvement in the EHR system implementation:

- The study concluded that nurses and doctors in the public hospital are involved in the EHR system implementation while patient administrators and ward clerks are not. The study further revealed that while most departments are involved in the public hospital, the admission department raised concerns of not being involved and shown willingness to take part.
- The study settled that users (nurses, doctors, patient administrators, filing and ward clerks) in the private hospital are not involved in the implementation

process of EHR system as all change management process are conducted by the head office. However, the hospital usually gets involved when testing the system to be implemented.

- The study discovered that the private hospital has one system controller who is intermediate personnel between the hospital and the head office for system related matters.

(n) The public hospital is supported and funded by the Department of Health (DoH) with the implementation and operation of EHR systems. Whereas the private hospital does not receive any form of support from DoH.

6.3.2 CHANGES EXPERIENCED BY PUBLIC AND PRIVATE HOSPITALS DUE TO EHR SYSTEM IMPLEMENTATION

(a) The public hospital is benefiting more as electronic health records systems is fully implemented and operational. On other hand, the private hospital is not benefitting much as the system it not yet fully implemented. Therefore, nurses and doctors still make use of manual recording including creation of new files.

(b) The public hospital prioritises the records management activities, while the private hospital does not prioritise it; instead, it has separate system for controlling files that are stored the offsite.

(c) Job description changes in the operation of EHR system without users realizing in both hospitals.

(d) Both hospitals have registry and filing clerks doing records management tasks but do not have qualified records management personnel with specialised skills.

(e) The incomplete implementation of the EHR system is costing the private hospital as the system create new files for every patient visit, resulting to challenges in the consolidation of patient files and length process of retrieving old files.

(f) The utilization of electronic medium systems in the private hospital prominently favours patient administrators and receptionists while the nurses are unsatisfied with the billing system.

(g) The electronic system used for managing records in the private hospital contained scanned patient files. The system only tracks and controls file movements but it is not incorporated with records management tasks.

(h) It easy to retrieve and access patient information in the public hospital, as records are always readily available in the EHR system during patient care. Similarly, the private hospital revealed that it is easy and quick to retrieve patient information primarily biographical data once captured on the system. The system also allows its users to delete errors identified by the system, however the retrieval of patient files is a length processes

(i) Both hospitals are benefiting from the use of the EHR systems. The study revealed that the EHR system in the public hospital is effective and feasible as other hospitals are benchmarking the system to initiate the implementation. The private hospital only benefit from the system on capturing patient information, medication stock control and billing.

(j) The study established that in case of disaster occurrences, the public hospital does have recovery plan for all electronic patient records; whereas, the private hospital has scanned files in another system separate from the billing system and does not have a backup plan for files stored offsite in case of unforeseen circumstances.

(k) Concerning the challenges in the use of EHR systems, the private hospital experienced lack of network connectivity and load shedding. In addition, user interface in the public hospital did not meet some users' requirements particularly doctors. While the private hospital was creating new files for every patient visit; in the public hospital, the study confirmed that not every data captured is stored by the system resulting to admission repeating the process and thereby increasing patient waiting time.

(l) The study identified some problems encountered in managing changes in the use of EHR systems. In the public hospital, the study revealed that companies developing EHR system software at times leaves the country. Therefore, it becomes challenging to manage system upgrades and forces hospitals to move from one system to another.

(m) Storage capacity is another problem encountered by the public hospital as number of patient increases; the system needs to be merged to accommodate new patients. The private hospital stores patient files offsite due to limited space.

(n) Both hospitals revealed that certain problems are realised when the system is already live. Training also becomes challenging when modifying or upgrading the system as users demand to be informed about sudden change and training also need to be provided.

6.3.3 MONITORING AND EVALUATION OF EHR SYSTEMS IN HOSPITALS

About monitoring and evaluation of EHR system implementation in hospitals, the study established that:

(a) The study sought to establish the control plans used to measure success or failure of the EHR system. The study established that the public hospital had control plans to measure system effectiveness but mostly dependent on the IT company to lead evaluations. The private hospital on the other hand did not have standalone control plans as all their processes are head office driven.

(b) In terms of monitoring the productivity; -both hospitals monitored the efficiency of users in the utilization of the system but there was no proper strategy documented. Hospitals monitored the systems based on what works for them.

(c) With regards to feedback being given to users on the system effectiveness. The study affirms that both public and private hospital do not provide feedback to users on the utilization of the system. Therefore, this is not good as users form essential part of the implementation process and form greater part of change management process.

6.3.4 TOOLS USED BY HOSPITAL MANAGEMENT TO REINFORCE CHANGE AND SUSTAIN RESULTS IN THE IMPLEMENTATION OF EHR SYSTEM

Concerning tools used by hospital leadership to reinforce change and sustain results in the implementation of EHR system; the study established that:

(a) Both public and private hospitals have tools in place that reinforces the EHR system implementation and operation. However, intense training was mostly emphasised by these hospitals. The study revealed that even though tools and plans to reinforce change are in place, there is a need to make sure hospitals sustain meaningful use of the EHR system. Continuous change management plan needs to be revised from *pre* to *post* implementation in order to obtain anticipated outcome.

(b) With regards to training provided to employees in the use of the system; the public hospital provides employees with basic computer training and EHR system training based on users respective duties; while the private hospital only provides employees with electronic system training.

(c) The study established that there is no standardised guidelines and policies in place supporting hospitals in the establishments of change management plan in the execution of EHR systems.

6.3.5 EFFECTIVE CHANGE MANAGEMENT PRACTICES IN THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS SYSTEM IN PUBLIC AND PRIVATE HOSPITALS IN THE ETHEKWINI AREA

With regards to effective change management practice in the implementation of electronic health records systems, the study established that:

(a) Based on the intention to use the system in hospitals; some users did not understand the intention of utilizing the system in their duties. Nurses in the private hospital for instance were uncertain about how the use of ICT benefits them as they still use manual recording in their daily tasks.

(b) In relation to strategies of managing changes in the use of EHR systems, the study revealed that both public and private hospitals have strategies in place. However, the study found that the private hospital is more reliant on the hospital head group in managing system modification. In the public hospital, the IT company handles all EHR system change management scope. The study affirmed that there is no official documented strategy to manage changes in both hospitals, each hospital does what seems convenience as system changes occur.

(c) In terms of forms of communication used to ensure hospitals have clear vision of using EHR system, similarities were found. Both hospitals revealed meetings, emails, gateways and email mostly used to interconnect with hospital employees. The study discovered that nurses were not much exposed to emails as the use of notice boards is mostly employed in both hospitals, and access to computers is limited.

6.4 RECOMMENDATIONS

The following recommendations are based on various findings of this study, and their alignment to the objectives of the study.

6.4.1 FACTORS FACILITATING THE ADOPTION OF EHR SYSTEMS IN PUBLIC AND PRIVATE HOSPITALS

a) In terms of the factors facilitating the adoption of EHR systems in public and private hospitals, the following are recommended:

b) The eHealth Strategy of South Africa should be continuously revised and amended to add on challenges that necessitate urgent solutions, in order to promote progress in the developments of electronic records health systems in public and private hospitals. This will make hospitals be more aware of the sense of urgency aiding the adoption of EHR systems.

c) The Department of Health should set standardised indicators that provide hospitals with guidance from initiation stage. The department should further conduct thorough assessment in hospitals prior, during and after the implementation. This will ensure that the operation of EHR systems serves its purpose and ensures people from operation form larger part of the implementation process.

d) In terms of EHR systems utilised; the private hospital needs to consolidate multiple systems in place to form one integrated system that consists of records management modules. This will allow easy consolidation of patients file without creating new files for each patient who visits their hospital. In essence, the system should be similar to the one implemented by the public hospital.

e) In relation to the application of change management processes in the implementation of EHR system; the study recommends that:

f) The public hospital needs to be at the forefront of document change management processes in the implementation and operation of EHR systems. The private hospital needs to be given an opportunity by the hospital head group to recommend on processes regarding the operation and utilization of electronic medium within hospital site. Their contribution will give insight and redirect the head office in understanding what is happening in the operation of the electronic systems implemented.

g) With regards to communicating the vision for using EHR system. There is a communication break down between the hospital management and employees in public and private

hospital. Both hospitals need to establish and keep constant communication at all times to prevent resistance and reassure users of the benefit of utilizing the system.

h) Both hospitals never share reasons for change or system modification, very few individuals receive detailed information. The study recommends that hospitals need to find other alternative channels of sharing or disseminating information to ensure hospital staff feel allowed to contribute input in EHR system and provide possible solutions to any challenges encountered.

i) The study recommends that users need to be engaged in the implementation process to create concrete and participatory climate for change that everyone cognisant about. In other words, involving users throughout the execution process ensures that staff have full ownership of the system and instils more willingness to use it.

j) In terms of support received from the Department of Health; the public hospital is fully funded by the Department of Health from implementation to operation phase of the EHR systems whereas, the private hospital is not supported by the Department of Health. Therefore, lack of adequate finance is hindering the implementation process as the hospital head group covers all financial costs regarding the system. The study recommends that the Department of Health should offer incentives to the private hospitals in order to reinforce full implementation of EHR systems. Upsurge in the use of EHR systems from both sectors will assist the Department of Health to achieve set objectives for the National Health Insurance that envisioned to enhance accessibility to quality health services to South African citizens. This is another priority of the eHealth Strategy of South Africa.

6.4.2 CHANGES EXPERIENCED BY PUBLIC AND PRIVATE HOSPITALS DUE TO EHR SYSTEM IMPLEMENTATION

With regards to changes experienced by both public and private hospitals due to EHR system implementation, the study recommends that:

(a) Similar to the public hospital, integration of ICT in records management in the private hospital should be fully adopted. This will allow effortless consolidation of patient information, improve file retrieval process and uphold effective visible changes benefiting the hospital. The private hospital needs to start prioritising records management in the use of electronic records system to be able to manage records onsite.

(b) About job restructuring in the implementation of EHR systems, the researcher discovered that employees duties changes without them realising in both public and

private hospital. Therefore, hospitals need to re-evaluate job descriptions and employees key performance to ensure that employees understand their primary job role in alignment with the vision of utilizing the system. Employee who resists change needs to be identified and continuously empowered.

(c) In relation to user acceptance in the implementation of EHR systems, the study revealed that users from the public hospital perceive EHR system effective as it enables them to do their jobs. Unlike the users in the private hospital who identified the electronic systems ineffectiveness in assisting with their primary task more particularly nurses as they still make use of manual recording. Therefore, the study recommends the following for the private hospital:

- The private hospital needs to consider integrating multiple systems utilised, and form one unified centralised system with additional modules that allow nurses to record patient charts and be able to view patient records. In that sense, users including nurses will definitely accept the use of ICT in their daily tasks, and effortlessly access information and thereby makes everyone benefits.
- The study recommends that the electronic records system linked to clinical and administrative duties for users to understand the use of the system in order to promote users' positive attitude towards the system.

(d) Both hospitals experience countless challenges in the use of EHR systems. The study recommends that public and private hospitals need to conduct user and case studies constantly to understand issues encountered in the use of the EHR system and receive feedback directly from users.

(e) Dissatisfaction experienced by most users gives an indication that EHR system vendors need to be involved and employ user centred design process in order to discover challenges encountered on ICT infrastructure and clinical work. Strong involvement from the hospital leadership, users (employees) and EHR system vendors is recommended throughout the implementation process.

(f) The public hospital revealed that companies developing EHR systems leave the country unexpectedly. Therefore, it becomes challenging to manage the EHR system and thus resulting to searching for another EHR system service provider, which constitutes financial burden. The study recommends that the Department of Health consider developing a database for EHR system vendors. The Department of Health needs to set criteria to be met by EHR system vendors to get accreditation to work with hospitals in

the implementation process. Therefore, this will circumvent vendors who are money-driven and deliver anticipated outcome. Again the Department of Health should find a way to motivate local software developers to realize the gap the South African country have in integrating ICT in health records management. Collaboration with academic institutions in developing the National Electronic Health Record System is highly recommended.

(g) Both public and private hospitals revealed that some challenges are realized when the EHR system is already running. The study suggests that hospitals should document all issues or incidents experienced before and after implementation including plan of action taken in order to have concrete directive when similar challenges occur in future.

(h) In terms of change resistance in the use of EHR system, both hospitals should consider involving staff (users) in every decision concerning the system. The study recommends that hospital leadership together with EHR system vendors understand the basis of user resistance in order to find possible solution together with the users. The hospitals should ensure that all users are well informed of whatever changes taking place, and not only when challenges are experienced in the EHR system operation. In addition, hospital leadership should always try to be objective in order to reach common settlement that will be in everyone's best interest.

(i) In terms of storage, the private hospital showed no challenge in storing physical files offsite storage except the length process of retrieving files from offsite; but the public hospital should reconsider data storage options that will keep up with changes including the way existing and new patients are treated. It should also consider data storage that will not make users repeat patient data capturing process as number of patients captured by the system increases.

(j) The private should consider having a timeline for the implementation process in order to cut off the old system used for transferring notes into the current electronic systems. This implies that the use of two electronic systems should be curbed as it is against user acceptance and thus hinders implementation progress.

6.4.3 MONITORING AND EVALUATION OF EHR SYSTEMS IN HOSPITALS

In terms of monitoring and evaluating the impact of EHR system implementation, the study recommends that:

(a) About control plans utilised to measure EHR system effectiveness; the public hospital should have proper documented monitoring and evaluation strategy in place to assess success or failure of EHR systems. Similarly, the private hospital should also have internal monitoring and evaluation processes on electronic systems and report feedback to the hospital head office for improvements.

(b) Both public and private should consider conducting regular evaluations for each department in order to understand challenges facing different users in their respective duties in the use of EHR systems.

(c) The Department of Health working together with hospitals should develop official change management framework for the implementation of EHR systems.

(d) Standardised formal monitoring and evaluation processes with tools need to be developed by Department of Health including indicators to measure effectiveness and level of user acceptance from *pre* to *post* implementation of the EHR system.

(e) Concerning providing feedback to users on EHR system effectiveness, both hospitals need to use formal and informal communication channels to disseminate information concerning the utilization of the system in order to reach users in different structures and encourage the use of the system.

6.4.4 TOOLS USED BY HOSPITAL MANAGEMENT TO REINFORCE CHANGE AND SUSTAIN RESULTS IN THE IMPLEMENTATION OF EHR SYSTEM

Concerning tools used by hospital leadership to reinforce change and sustain results in the implementation of EHR system; the study recommends that:

(a) Tools and plans to reinforce change that comes with EHR systems are necessity. As a practice in the public hospital, the private hospital management should fully implement the EHR system for all users and cut off the use of manual files in order to benefit from the system.

(b) Both public and private hospital management, employees and all parties, must be involved in sustaining EHR system positive outcome, through solving challenges in the use of the system to accomplish EHR system meaningful use.

(c) The public hospital has different communication channels that the management uses to communicate with employees unlike few in the private hospital, therefore the management in the private should encourage access to emails as a primary source of information to communicate with hospital employees from all levels.

(d) The private hospital do need to cut off the old system and only use the new system in order to avert conflict between patients and the hospital. This will also reinforce and encourage the use of the new system without resistance and improve accurate billing.

(e) With regards to training provided to hospital employees, the private hospital should learn the style used by the public hospital as follows:

- The private hospital should consider offering hospital employees with basic computer literacy courses to ensure users have appropriate skills prior to the actual electronic system training.
- Writing assessments and provide users with certificates to motivate and instil willingness and assertiveness to use electronic systems. The private hospital should also offer refreshment training to ensure users have positive attitude towards the system.

(f) The public hospital has the IT company onsite that is responsible for EHR system infrastructure and queries, therefore; the private hospital should also consider having IT consultants onsite as one system controller was working with the entire hospital. The study recommends that the private hospital adds computers, billing screens including charging points as technology equipment used for electronic system is limited and nurses raised that they sometimes have to wait for one another to use the system.

(g) Clarity regarding change management policies and procedures in the implementation of EHR system in both public and private hospitals is required. The study recommends the Department of Health liaise with the National Archives of South Africa in developing policy and procedure manuals that guide hospitals in the implementation of EHR systems in hospitals.

6.4.5 CHANGE MANAGEMENT PRACTICES IN THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS SYSTEM IN PUBLIC AND PRIVATE HOSPITALS IN THE ETHEKWINI AREA

Concerning effective change management strategy for electronic health records systems in public and private hospitals in the eThekwini Area, the study recommends that:

(a) In terms of intention to use the EHR systems, the users in the public hospital understood the role of using EHR system in their daily tasks, while the users in the private hospital were uncertain as to whether electronic systems works in their interest. The study highly recommends the private hospital to implement EHR system for users to realise the

meaningful use. Meanwhile, the hospital needs to conduct continuous orientation to clarify the intention of utilizing the system in place in order to instil more willingness and buy in from users. Clear reason for the using ICT systems in the hospital must be known and clear to the users.

(b) Implementation of strategies that will engage and represent all structural level in the change process is recommended. The researcher determined that the public hospital is reliant on the IT company for EHR change management scope. The private hospital also gets directives from the hospital head group and have no control. Hospitals need to have documented strategy to manage changes that can be amended and reviewed whenever required with inputs from users.

(c) Both hospitals have different form of communication channels in place but overlook the use of emails by nurses who primarily capture patient's information in the EHR systems. The study recommends that hospitals set up formal and informal channels to disseminate information about EHR systems and engage with users form all levels. The study further recommends that hospital leadership listen to various views of the hospital users (employees) as they are the experts in the operation of EHR systems.

6.5 RECOMMENDATION FOR FUTURE STUDY

This study provides perspicacity on change management and user acceptance in the implementation and operation of electronic health records systems in public and private hospitals. This comparative study shows the importance of aligning change management approach in the execution process and utilization of EHR systems in order to accomplish anticipated outcome. The study accentuated that there is a need for sanction, monitoring and evaluation plan for health information systems in South Africa in order to track progress and measure the effectiveness of the health information systems. The study recommends standardised change management framework in the implementation and use of electronic health records systems in order to reassure acceptance and involvement of users in the execution process. The study recommends additional comparative studies broadly conducted in KwaZulu-Natal and other provinces in order to get an insight of the EHR system implementation status in the country, thus providing solutions to challenges facing hospitals with electronic health records management.

6.6 CONCLUSION

The study assessed change management in the implementation of electronic health records systems in public and private hospitals in the eThekwini area, South Africa. The findings of the study showed that ill-defined change management approach and unbalanced user acceptance dissuade EHR system effectiveness. The study examined factors facilitating the adoption of EHR systems and determined changes experienced by hospitals and users in the operation of EHR systems. The study responded to challenges stated by the eHealth Strategy of South Africa that sets to improve public health services using ICT systems that also emphasise the importance of bridging the gap between public and private health sector. The study revealed that although it is common challenges that drive both public and private hospital to implement the EHR systems, the hospitals used the system for varied reasons, in particular, the private hospital, which is commercialised. The study further revealed that private hospital experienced challenges of integrating ICT records management as the EHR system is not used fully; hence, some users do not understand the intention of utilising the electronic systems in their duties.

The study further looked at the monitoring and evaluation of the EHR systems including tools used by the hospital leadership to reinforce change and sustain results. The findings revealed that there was no proper monitoring and evaluation strategy documented. Each hospitals monitored the systems based on what relevant to them at that particular time. Moreover, the public hospital is reliant on the IT company regarding monitoring and evaluation processes while in the private hospital all processes derive from the hospital head group. Both hospital have operational procedures in the use of the EHR system but not policy or procedure guiding the change management process in the implementation of EHR systems.

Lastly, the study showed that undefined change management plan could hinder user acceptance and weaken developments of the EHR system implementation. The study recommends development of documented and change management framework that will aid continuous review of EHR system and its execution. Similarly, monitoring and evaluation plan from *pre* to *post* implementation, and active involvement of users from all hospital structural level including leadership were also recommended. In addition, regular training and refreshment training were recommended in reinforcing users' acceptance of the system .The study further recommended regulatory framework that will give accreditation to EHR system vendors or software developers to encourage progress in the implementation of EHR system in both public

and private hospitals. It was also stated that the Department of Health should also consider sharing expertise with other developed countries through emerging researchers and experts in different fields.

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Appendix 1: INFORMED CONSENT FORM

UNIVERSITY OF ZULULAND

Tick to confirm

I confirm that I have read and understand the information sheet dated……/…../……..for the above study. ☐

I have the opportunity to consider the information, asked questions and have had these answered satisfactorily. ☐

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my employment or legal rights being affected. ☐

I understand that responsible individuals may look at relevant sections of any of information I provide during the study, from the research team or from regulatory authorities. ☐

I agree to take part in the above research study. ☐

_____	_____	_____
Name of Participant	Date	Signature

_____	_____	_____
Name of Researcher	Date	Signature

Appendix 2: INTRODUCTORY LETTER

Dear Respondent,

I am a Master's candidate in the Department of Information Studies at the University of Zululand conducting a comparative study of Change management in the Implementation of Electronic Health Records Systems in Public and Private Hospitals in the eThekwini Area, KwaZulu-Natal, South Africa.

You are therefore, kindly asked to make some time for the interview which will enable me to to assess change management effect in the implementation and operation of electronic health records system in your hospital, on how they may effective success or failure of using the system in healthcare service delivery.

For any queries about the study, please do not hesitate to reach me using the undersigned contact details: Email: mandisamsomi89@gmail.com or 071 971 5570/ 072 355 69639.

Yours Sincerely,

Ms M. Msomi

Thank your participation.

Appendix 3: INTERVIEW GUIDE FOR MANAGEMENT STAFF

JOB TITLE:

DEPARTMENT:

A. FACTORS FACILITATING THE EHR ADOPTION.

1. What sense of urgency facilitated the adoption of electronic health records in your hospital? ----------

2. What problems do you encounter in managing EHR change? ----------

3. What your division is responsible for in EHR adoption, implementation or operation**?**-------

4. How important is change management in the adoption of health information system in your hospital? ----------

A. MANAGEMENT OF CHANGE IN ELECTRONIC HEALTH RECORDS

5. What support do you receive from Department of Health in managing EHR system changes?----------

6. Are you aware of eHealth strategy of South Africa that set to lead the health information management**?**----------
---
---

7. Are there strategies or approaches used to manage EHR change in the hospital**?**----------
---

---

8. What tools or plans used to reinforce change in the hospital**?**----------
---

---

9. What training has the hospital provided staff in using electronic health records?----------
---

---

10. What are form of communication used to ensure that the hospital have a clear vision on using EHR system implementation or operation?----------
---

B. ELECTRONIC HEALTH RECORDS CONTROL PLANS

11. What control plans do hospital has to measure success or failure of EHR system**?**----------
---

---

12. How hospitals monitor effect of EHR in staff productivity**?**----------
---
---

13. What are necessary skills provided by the hospital to employees for proficient use of EHR?----------
---
---

14. What do you think is the effective approach to manage EHR change**?**----------
---

---

15. What change management policies and procedures in place guiding the electronic health records systems implementation?----------
---

Appendix 4: RESEARCH QUESTIONNAIRE

THE SEMI-STRUCTURED QUESTIONNAIRES EHR SYSTEM USERS

(DOCTORS, NURSES, FILING OR WARD CLERK, RECEPTIONIST, RECORD PERSONNEL'S, IT SPECIALISTS & PATIENT ADMINISTRATORS**).**

Dear Respondent,

I am a final year postgraduate student at the University of Zululand, pursuing Masters of Arts in Information Science. As part of the requirements, I have to undertake a research project to assess***, Change Management in the implementation of Electronic Health Records systems in the public and private hospitals in the Ethekwini Area, Kwa-Zulu Natal, South Africa.*** I kindly request for your valuable time to provide information by way of answering this questionnaire. The results will be treated with utmost confidentiality and will be used for academic purposes only. I am very much thankful for your cooperation.

Kindly indicate by putting a cross sign [X] or a tick sign [√] next to the correct answer and explain where possible.

Section A: **BACKGROUND OR BIOGRAPHICAL INFORMATION**

1. Type of hospital

(a) Public	
(b) Private	

2. Please indicate your gender

(a) Male		(b) Female	

3. Please Indicate your age

(a) 18-25	
(b) 25-35	
(c) 35-45	
(d) 45+yrs	

4. What is your job title in this hospital?

(a) Doctor	
(b) Nurse	
(c) Receptionist	
(d) Filing or Ward Clerk	
(e) Records management personnel	
(f) Patient administrators	
(g) Other:	

5. What is your highest qualification?

(a) Matric	
(b) Diploma	
(c) Degree	
(d) Other	

6. How long have been working in this hospital?

(a) 0-5 yrs.	
(b) 5-10 yrs.	
(c) 10-15 yrs.	
(d) +15 years.	

Section B: USERS' ACCEPTANCE AND ADOPTION OF ELECTRONIC HEALTH RECORDS (EHR)

7. To what extent are you aware of the Electronic Health Records system? Please indicate by ticking one answer.

(a) Not Aware	
(b) Somewhat Aware	
(c) Usually aware	
(d) Aware	

8. How long have you known or used the current EHR system? Please indicate by ticking one answer.

(e) 0-5 yrs.	
(f) 5-10 yrs.	
(g) 10-15 yrs.	
(h) +15 years.	

9. What do you use the electronic health record system for? You can choose more than one answer.

(j) Admitting	
(k) Billing	
(l) Discharging	
(m) Referring	
(n) Retrieving files	
(o) Capturing patients information	
(p) Prescription	
(q) Diagnosing	
(r) Any other task, please specify :	

10. How familiar are you with the current system? Please indicate by ticking one answer.

(a) Not familiar	
(b) Somewhat familiar	
(c) Familiar	
(d) Very familiar	

N.B Please indicate by choosing one answer on each statement.

11. Perceived usefulness of EHR	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
(a) Electronic health records system enables me to do my job accurately.					

(b) Electronic health records increases my productivity					
(c) Using electronic health records enable me to easy access lot of information related to my job.					
(d) Electronic health records enhance my effectiveness of service delivery.					
(e) An electronic health record makes it easier for me to do administration.					
12. Perceived ease of use of EHR	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
(a) Learning to use electronic health records system is or was easy for me.					
(b) I find it easy to record patients information					
(c) I find it easily to record information using electronic health records system.					
(d) I find it easily to locate records using electronic health records system.					
(e) I find it easily to retrieve records using the electronic health records system.					
(f) I find it easily to file records using electronic health records system.					
(g) I experience challenges doing my daily duties using electronic health records system.					
13. Attitude towards use of EHR	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**

(a) Using an electronic health records system is a good for my work.					
(b) Using an electronic health records is a wise idea.					
(c) Using an electronic health records is a positive idea.					
(d) I like using electronic health records system.					
14. Intention to use HER	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
(a) It is probable that I will continue using electronic health records.					
(b) I intended to continue using electronic health records system to do my work.					
(c) I will frequently use electronic health records system in the future.					
(d) I will recommend others to use the electronic health system records.					

15. What are challenges are you experience when using the electronic health records system? (Tick as many)

(m) Slow retrieval	
(n) Poor data storage	
(o) Lack of network connectivity	
(p) Removal of records	
(q) Data error	
(r) Lack of anti-virus update	
(s) Patient waiting time has increased	
(t) Difficult in tracing records in the system.	
(u) Lack of privacy and security to patient's information.	
(v) Poor user interface in the creation of records.	
(w) Power cut and load shedding.	
(x) Insufficient time to interact with patients.	

(y) Other:	

16. What do think are the benefits of using electronic health records systems? ----------
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SECTION C: ASSESSING CHANGE MANAGEMENT IN EHR SYSTEM IMPLEMENTATION OR OPERATION BY THE USERS

17. Do you think there was or is any sense of urgency to initiate or improve or upgrade the electronic health records system in place?

(a) Yes		(b) No		(c) Not Sure	

18. How often are you involved in the discussion of implementing or improving or upgrading the electronic health records system?

(a) Often	
(b) Sometimes	
(c) Rarely	
(d) Never	

19. Does the hospital management share reasons for making any changes in the electronic health records system with you?

(e) Often	
(f) Sometimes	
(g) Rarely	
(h) Never	

20. How often is the vision of using electronic health records system communicated to you?

(a) Often	
(b) Sometimes	
(c) Rarely	

(d) Never	

21. When the system was introduced, was there any job re-structuring or changes in your job description to enhance the productivity of your tasks?

(a) Yes		(b) No		(c) Not Sure	

22. Is it clear that using EHR system on your daily duties has been enhanced for you to be more productive?

(a) Not clear	
(b) Somewhat clear	
(c) Clear	
(d) Very clear	

23. Is there performance evaluation conducted when there are changes in the electronic health records system? Yes or No, If yes how are you evaluated? ?----------
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24. Is there feedback given by the hospital on the effect of using the electronic health system overtime?

(a) Often	
(b) Sometimes	
(c) Rarely	
(d) Never	

25. Do you think using electronic health records improve the way you do your work? You can tick more than one answer.

(e) Provide accurate health information.	
(f) Keep information up to date.	
(g) Complete patient's information at a point of care.	
(h) Easy interaction and communication between health personnel.	

26. What would be recommended ways to encourage or improve the use of electronic health records system? ----------
---

Appendix 5: RESEARCH OBSERVATION CHECKLIST

TYPE OF HOSPITAL:

NAME OF THE SYSTEM:

	Items to Observed	Indicators
1.	**Electronic Health Records Management systems**	Fully operational/ covering all the health care services. User interface
COMMENTS:		
2.	**EHR user interaction with patient**	Admission. Online booking or referrals, billing, e-prescription, treatment and lab orders and results, clinical exchange of document data
COMMENTS:		
4.	**Access & use**	Retrieval tools (Indexes) Classification schemes File tracking devices
COMMENTS:		
5.	**Appraisal & retention schedules**	Electronic records preservation or retention

	of electronic health records	
COMMENTS:		
6.	**Security in EHR system**	Security measures in place
COMMENTS:		

Appendix 6: ETHICAL CLEARANCE FROM UNIVERSITY OF ZULULAND

UNIVERSITY OF ZULULAND
RESEARCH ETHICS COMMITTEE
(Reg No: UZREC 171110-030)

RESEARCH & INNOVATION
Website: http://www.unizulu.ac.za
Private Bag X1001
KwaDlangezwa 3886
Tel: 035 902 6731
Fax: 035 902 6222
Email: DlaminiA@unizulu.ac.za

ETHICAL CLEARANCE CERTIFICATE

Certificate Number	**UZREC 171110-030 PGM 2018/512**							
Project Title	**CHANGE MANAGEMENT IN IMPLEMENTAION OF ELETRONIC HEALTH RECORDS SYSTEMS IN PUBLIC AND PRIVATE HOSPITALS IN THE ETHEKWINI AREA**							
Principal Researcher/ Investigator	M Msomi							
Supervisor and Co-supervisor	Prof T Kalusopa							
Department	Information Science							
Faculty	Arts							
Type of Risk	Med Risk- Data collection from people							
Nature of Project	Honours/4th Year		Master's	x	Doctoral		Departmental	

The University of Zululand's Research Ethics Committee (UZREC) hereby gives ethical approval in respect of the undertakings contained in the above-mentioned project. The Researcher may therefore commence with data collection as from the date of this Certificate, using the certificate number indicated above.

Special conditions:

(1) This certificate is valid for 1 year from the date of issue.
(2) Principal researcher must provide an annual report to the UZREC in the prescribed format [due date- 13 September 2019]
(3) Principal researcher must submit a report at the end of project in respect of ethical compliance.
(4) The UZREC must be informed immediately of any material change in the conditions or undertakings mentioned in the documents that were presented to the meeting.

The UZREC wishes the researcher well in conducting research.

Professor Gideon De Wet
Chairperson: University Research Ethics Committee
Deputy Vice-Chancellor: Research & Innovation
13 September 2018

CHAIRPERSON
UNIVERSITY OF ZULULAND RESEARCH
ETHICS COMMITTEE (UZREC)
REG NO: UZREC 171110-30
STAMP
18 -09- 2018
RESEARCH & INNOVATION OFFICE

Appendix 7: APPROVAL OF RESEARCH: PUBLIC HOSPITAL

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Physical Address: 330 Langalibalele Street, Pietermaritburg
Postal Address: Private Bag X9051
Tel: 033 395 2805/ 3189/ 3123 Fax: 033 394 3782
Email:
www.kznhealth.gov.za

DIRECTORATE:
Health Research & Knowledge Management

NHRD Ref: KZ_201810_004

Dear Ms M. Msomi
University of Zululand

Approval of research

1. The research proposal titled **'Change management in implementation of electronic health records systems in public and private hospitals in the eThekwini area'** was reviewed by the KwaZulu-Natal Department of Health.

   The proposal is hereby **approved** for research to be undertaken at Inkosi Albert Luthuli Central Hospital.

2. You are requested to take note of the following:
   a. Kindly liaise with the facility manager BEFORE your research begins in order to ensure that conditions in the facility are conducive to the conduct of your research. These include, but are not limited to, an assurance that the numbers of patients attending the facility are sufficient to support your sample size requirements, and that the space and physical infrastructure of the facility can accommodate the research team and any additional equipment required for the research.
   b. Please ensure that you provide your letter of ethics re-certification to this unit, when the current approval expires.
   c. Provide an interim progress report and final report (electronic and hard copies) when your research is complete to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

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

Yours Sincerely

Dr E Lutge
Chairperson, Health Research Committee
Date: 14/11/18

Fighting Disease, Fighting Poverty, Giving Hope

Appendix 8: APPROVAL OF RESEARCH: PRIVATE HOSPITAL

Life Group
HEALTH CARE

National Health Research Ethics Committee registration: **REC 251015-048**

REF: 04252019/1

25 April 2019

Dear Mandisa Msomi

RE: APPLICATION TO CONDUCT RESEARCH:

Title of study: Change management in the implementation of Electronic Health Record Systems in Public and Private Hospitals

The Research & Scientific Committee of Life Healthcare Group hereby grants permission with no conditions for your study to be conducted

1. If patient or institutional confidentiality is breached, Life Healthcare is entitled to withdraw this permission immediately. The Higher Education institution under which the research is taking place will be notified, and Life Healthcare reserves the right to take legal action against you, should the company feel that this is warranted.
2. An electronic copy of the research report must be submitted to the Life Healthcare Research Ethics Committee prior to publication. Failure to do this may result in permission to continue to examination being withdrawn. The Higher Learning institution will be notified of this withdrawal.
3. No direct reference may be made to Life Healthcare, its subsidiaries or any of its facilities or institutions in the research report or any publications thereafter. The Company and its facilities, patients and staff must be de-identified in the study, and remain so for any other studies which may utilise this information.
4. The research must be completed within the time allotted by the Higher Learning institution. If the research is being done in an individual capacity by an employee of the life Group, the research must be conducted within one year of permission being given by the Company, OR the proposed time period must be specified in the proposal, and approved. Permission may be withdrawn if the research extends beyond the approved time period.
5. Life Healthcare will not take responsibility for any unforeseen circumstances within its institutions which may materially change the context and potential outcomes of a student's research. Should this occur, the student will be required to approach their Higher Learning institution for guidance around alternatives.
6. Placement of the electronic research report and any publications on the Company's research register after approval by the associated Higher Education Institution.
7. Life Healthcare will not be liable for any costs incurred during or related to this study.

Yours sincerely,

On behalf of Research & Scientific Committee

ANNEXURE A: SUMMARY TABLE ADDRESSING EXTERNAL AND INTERNAL COMMENTS

SUMMARY TABLE ADDRESSING EXTERNAL EXAMINER'S COMMENTS

TITLE: CHANGE MANAGEMENT IN THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS SYSTEMS IN PUBLIC AND PRIVATE HOSPITALS IN THE ETHEKWINI MUNICIPALITY, KWAZULU-NATAL, SOUTH AFRICA

Candidate: Mandisa Msomi **Supervisor: Prof T. Kalusopa**

EXAMINER 1

External Examiner's Comments		Supervisor's Response	Candidate's Comments (Action taken)
1.	**Cover page, Abstract, Table of Content and Observations**		
	(a) Is this area a local municipality or district, what is it?	Comments noted and action taken	The location of the study has been rectified to municipality level.
	(b) Co-supervisor not reflected on the cover page	Comments noted and action taken	Co-supervisor reflecting on the cover page
	(c) Use abbreviation in brackets first	Comments noted and action taken	The words was written in full, the use of abbreviation was corrected and in bracket
	(d) On the abstract present only the key findings in one to two sentences	Comments noted and action taken	The key findings are presented in two sentences
	(e) On the abstract present the key recommendation in one to two sentences	Comments noted and action taken	The key findings are presented in two sentences

	(f) Automate your table of content	Comments noted and action taken	The table of content was update and automated.
	(g) But the study is about private and public hospital	Comments noted and action taken	The private and public hospital name was rectified
2.	**Chapter one: Background of the Study**		
	(a) Bold numbering too (b) Reconstruct and avoid long sentences (c) Long-life (d) Space unnecessary (e) Page numbers?	Comments noted and action taken Comments noted and action taken Comments noted and action taken Comments noted and action taken Comments noted and action taken	Numbering were bolded The word was changed to lifelong The spacing was rectified
	(a) On 1.2 definition of key terms used in the study may be placed just before the problem statement	Comments noted and action taken	The definition of key terms used is place before the problem statement on see page:2-3
	Location and Context of the study (a) Is this your exact area of study, if yes specify in the title (b) Why choose the two hospitals out of all?	 Comments noted and action taken Comments noted and action taken	 The area was rectified in the study tittle The selection of two hospitals was explained clear
	Statement of the problem (a) The problem to the study is not clear, what exactly is the study attempting to solve. You only speak to lack of literature addressing change management. What	Comments noted and action taken	The problem statement was cleared and tightened

	problem exactly affecting healthcare service due to lack of change management implementation in adopting e-health systems		
	Research purpose and objectives (a) The purpose of the study needs to be properly constructed.	Comments noted and action taken	The aim of the study was addressed and tightened.
	Study objectives and research questions: (a) Try to align your questions to objectives.	Comments noted and action taken	The research objectives and questions were aligned.
	Justification of the study (a) Long sentences	Comments noted and action taken	The sentences were reconstructed and shorten
	Scope and limitations: **(a)** Talk to inclusive and exclusives in terms of areas, institutions, units and functions and systems	Comments noted and action taken	Inclusive and exclusive information about the scope of the study was added.
	Chapter Two: Literature review (a) Themes must be informed by objectives (b) Focus only on theory informing your study on 2.2 (c) 2.2.1 On eight steps cite John Kotter as a source? (d) The steps of the leading change were supposed to be converted to objectives and this may be the only or main theory framing the study (e) Cite on page John Kotter page 29?? (f) Source	Comments noted and action taken Comments noted and action taken Comments noted and action taken Comments noted and action taken Comments noted and action taken Comments noted and action taken	Themes and content were aligned to the objectives Leading change model with technology acceptance model inform the study on Citation corrected page Leading change model in integration with technology acceptance model frame the study Citation provided, see page: 24 Source provided

	(g) Refer to your figures and tables in your discussion	Comments noted and action taken	Tables and figured were referred in the discussion.
	(h) You cannot start the section with figure 2.2 without first explaining the technology acceptance model	Comments noted and action taken	The technology acceptance model was discussed before figure 2.2
	(i) There was supposed to be an objective that determine how staff perceive change to EHR	Comments noted and action taken	Changes experienced by hospitals due to EHR systems implementation cover how staff perceive change, page??
	(j) Where is open quote? Page??	Comments noted and action taken	Open quote was provided
	(k) Not relevant information for chapter two.	Comments noted and action taken	The following was moved to chapter one from chapter two as it caused confusion on the main theory adopted and falls under introduction and background of the study: -The conceptual framework of change management is the framework and was moved to Chapter one (see page 3) -Importance to change management in EHR system (see page 6)
	(l) This chapter need to be seriously refocused in line with the objectives to make sure the themes are in line with objectives. It is only one theme that clearly talks to the theme of **"To determine factors facilitating the adoption of EHR systems in public and private hospitals."**	Comments noted and action taken	Themes were revised and re-aligned to the objectives
	(m) The author need to address the objectives in the literature as well. You need to	Comments noted and action taken	The literature was addressed based on the objectives of the study. The main theme were

	formulate your themes based on the objectives to avoid leading astray. E.g. for your main themes in the literature review. • factors facilitating the adoption of EHR systems • changes experienced in EHR systems implementation • monitor and evaluate the EHR systems implementation. • tools to reinforce change and sustain results in the implementation of EHR system. • change management strategies		corrected and corresponding with the objectives.
	Relevance of the Theoretical Framework to the Study (a) Specify the model you adopted to frame the study (b) It need to be based on the nature of your study	Comments noted and action taken Comments noted and action taken	Model that frame the study is specified Issues related to the theoretical framework to the frame work were addressed

	Research methodology: (a) You were supposed to provide a linking statements to the previous chapter. (b) tool? (c) relook at relevancy for this to mixed method, it looks applicable to quantitative study (d) you supposed to also quantify your total population here, how many and institution and individual members per portfolio? (e) You need to explain your sampling methods and state how they are suitable for this study (f) You also need to specify the data collection tools applicable to the sampling and size of sample you are presenting. I suspect these data to be for only questionnaire but how many people were interviewed (g) Figures in this column need to be narrated under the Population of the study item above. (h) How did you pre-test on the targeted population, you need to explain it to readers (i) Which instruments or software did you use to analyse both kinds of data, e.g. SPSS, etc. I was expecting to see more about what the policy says in terms of ethical issues to research and how you have gone to complying with those. Also try to	Comments noted and action taken Comments noted and action taken Comments noted and action taken	The linking statement was provided see page: 47 The uncompleted word was corrected The relevancy of the mixed method clearly explained as to why it was used in the study. The total population was quantifies and number of institutions specified. See Table 3.1 and 3.2 The sampling method was well explained and clearly too why used in the study. The data collection tools applicable to the study and the sampling size was specified and explained. Action was taken see page: 51 The pretesting of data collection tools on the target population was explained, see page 53 Google Forms was used to analyse data see page:58

	cite few sources on this, especially methodology books that you being consulting.		The ethical consideration was revised and clear based on the examiners comment, see page: 57
	Data Analysis: (a) Topic chapter must be change to Analysis and presentation of data. (b) Numbering. Why not focus on addressing objectives than answering questions (c) This sound to be a repetition to information presented in methodology chapter and looks irrelevant here. (d) data collection procedure (e) be clear about data collection technique (f) It will be better not to colour the tables, otherwise it may affect visibility in print (g) 4.4.1 Extent may need to be measured (h) 4.4.3 Literature was supposed to support the discussion in chapter 5 and chapter 4 just present data raw as it was collected (i) Put your headings in a heading form, not conclusive form	Comments noted and action taken	Topic chapter changed. The study focus on addressing objective than answering questions, see page: 59 The repeated and irrelevant information was removed. Information on data collection procedure was removed and placed on chapter 3, see page: 54 The data collection procedure were specified and clear on chapter 4 Colours on tables were removed. 4.4.1 Heading was revised, the word extent was replaced with awareness Literature was removed on 4.4.3. The headings were put in a heading form and paraphrased

	Discussion and interpretation of results (a) How does this differ to the discussion and interpretation. I believe the previous chapter was supposed to focus on presentation of findings only and this was going to analyse in a form of interpretation and discussion. What I read in the chapter 4 was actually presentation and interpretation as well as discussion. This renders this chapter useless because you may just simply repeat what you said in the chapter 4 (b) I was expecting discussion in interpretation than listing ideas in this section	Comments noted and action taken Comments noted and action taken	This chapter was thoroughly revised. The list of ideas were removed from chapter four.
	Summary of findings, conclusion and recommendations: (a) You need to provide a link to the previous chapter 6 (b) I thought you will list only changes in summery (c) I thought you will list only factors in summery (d) Your numbering		The linking statement on chapter 6 was provided. See page: 157 The changes are provided in summary, see page: 161 The factors are provided in summary, see page: 166 Numbering on 6.4.1 was rectified
	Referencing: (a) The following are incomplete: 1. Creswell (2007) 2. Creswell (2005) 3. Deokar and Sarnikar's (2016)	Comments noted and action taken	All reference were completed accordingly

	4. Kalusopa (2011) 5. Kalusopa (2016) 6. Kleynhans (2011) 7. Kotter (1996) 8. Kotter (2007)		

STUDENT SIGNATURE: ……  **……. DATE:…….22 May 2020……..**

SUPERVISOR SIGNATURE: …….. ……..…….DATE:……22 May 2020……

SUMMARY TABLE ADDRESSING EXTERNAL EXAMINER'S COMMENTS

TITLE: CHANGE MANAGEMENT IN THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS SYSTEMS IN PUBLIC AND PRIVATE HOSPITALS IN THE ETHEKWINI MUNICIPALITY, KWAZULU-NATAL, SOUTH AFRICA

Candidate: Mandisa Msomi

Supervisor: Prof T. Kalusopa

EXAMINER 2

External Examiner's Comments		Supervisor's Response	Candidate's Comments (Action taken)
3.	**Technical presentation**		
	(h) There is need to do editing of sentences and some words used need to be changed. (i) Check numbering of some sections, the numbering does not flow well. E.g. from presentation on page 81 and cross check the rest of numbering. (j) Sign the declaration after revising for final submission.	Comments noted and action taken	The sentences were edited. The numbering was corrected and updated corresponding to the flow of the presentation The declaration was signed

4.	**Comments on the body of literature** **(a)** TAM and EHR mentioned in the abstract should be in written in full the first time.	Comments noted and action taken	Technology acceptance model and electronic health records was corrected and written in full.
	Chapter 1: introduction (a) Let this chapter read as **Chapter 1: Introduction** and then have 1.1 as Background to the study. **(b)** revise the first sentence starting the background **Location of study:** (c) Pages 5-6: for KZN; DoH and CHC, provide full names the first time and abbreviate later. (d) Page 6: - Use semi-colon for long lists, under (b) The private hospital X (e) Page 6: Under Statement of Problem, I believe the use of HER should be EHRS to represent system if I am right please correct. **1.6 Objectives** (f) Under the objectives, and not use point form. Do the same for research questions. (g) Objective 5 is about strategy and same question is practice, please reconcile and standardise.	Comments and action taken Comments and action taken Comments and action taken	The Introduction is refereed as chapter one and Background to the study as 1.1, see page: 1 First sentence was revised The abbreviation were written in full Revised as advised

	Justification **(h)** Page 8: you use a lot of “may” and this does not show confidence in your results. **<u>Summary</u>** (i) Summary you should summarise and not only repeat outline of chapter.	Comments and action taken	The correct abbreviation is EHR The point were removed and questions alphabetical order, see page: 19 The objective were reconciled and standardised, see page: 19 The word maybe were paraphrased.

			The summary was revised and tightened.
	<u>CHAPTER 2: LITERATURE REVIEW</u> (a) Page 20: provide source for the figure. (b) Page 22: The whole of the section, do the sub-sections represent the key elements under importance of change management. Some of these sound irrelevant like the continuum and managing electronic records. I am trying to figure out how these link with importance of change? See comments within document. Also from page, I am not seeing the relevance of discussing Acts? (c) Page 31, in the title is facilitating the write word to use? Revise. (d) Check the use of tenses. Remember study has been completed and use was **<u>Challenges facing</u>**	Comments and action taken	The source on Figure 2.1 was provided The irrelevant information was removed.

	(e) Is this challenges or changes? I some parts it reads as changes? Check again. How will the challenges inform your study? **Summary** (f) In your gaps please emphasise on the gaps in literature and create linkage to the study.	Comments and action taken Comments and action taken Comments and action taken Comments and action taken	Revised, see page: 30 The tense used in the study was revised. The study explain how challenges correlate with changes experienced in using in EHR. See page, 34 The literature gaps emphasised and tighten.

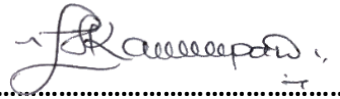
	<u>CHAPTER 3: RESEARCH METHODOLOGY</u> **Introduction** (a) Make the introduction short and let it introduce the chapter. **Research paradigm** (b) Where I underline, please revise sentence or words. **Sample size** (c) Mention the total target population in the description of sample size.	Comments and action taken Comments and action taken Comments and action taken	The introduction on chapter 3 was revised as per comment. The sentence was paraphrased. The total population was indicated.
5.	**<u>CHAPTER 4: PRESENTATION AND ANALYSIS OF FINDINGS</u>** (a) What would be the difference between analysis, interpretation and discussion: These are the		

	same. So this chapter should only be called presentation of findings. Then chapter 5 will be discussion or analysis of findings. (b) On pages 59, and 61 and 62: All that information should be under methodology. So there is no need to repeat the methodology process here. See specific comments in the document (c) Please look again as your sub-headings and make sure they are aligned to the objectives. I see so many new sub-headings being introduced nd they don't appear anywhere earlier in the document. See specific comments in the document. e.g. how do sub-themes like communicating vision on page 67 link to objectives? Try and align and may some merge. Some of these themes should have been mentioned in literature (2.6).	Comments and action taken Comments and action taken Comments and action taken	The heading for Chapter 4 was corrected, see page: 59 The repeated information was removed. The sub-heading in Chapter 4 were merged and aligned.
6.	**CHAPTER 5: DISCUSSION AND INTERPRETATION OF FINDINGS** (a) For this chapter ensure you don't repeat the findings as they are in previous chapter but you		

	can summarise them before their interpretation. The chapter looks fine. Just revise and ensure it's aligned to chapter 4. (b) The main problem I encouraged during reading is that there so many emerging factors that you are presented under the main headings. Please see how you can merge some of them, they distract reading. I have made comment on the document. Some sound repetitive. They are just too man and for I was distracted during reading.	Comments noted and action taken Comments noted and action taken	Chapter 5 was revised to ensure that it aligns with Chapter 4 The sub-headings were consolidated.

	CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS. (a) All the three sections are too long. Summarise the conclusion into paragraphs representing each theme. No need for the whole list. (b) Recommendations are also too many. Please pick only the key ones. You don't need to have so many to match the findings. **Final Comment and Recommendation** **(c)** The discussion is quite good. But address the comments in this report and the document. I recommend minor corrections which should not take more than a month. A paper can be published form the findings.	Comments noted and action taken Comments noted and action taken	The section were summarised in line with the objectives. The discussion was addressed based on examiners comment

STUDENT SIGNATURE: ……  **……DATE:……22/05/2020……**

SUPERVISOR SIGNATURE: ……  **……DATE……..22/05/2020……..**