FACTORS INFLUENCING ADOPTION OF ELECTRONIC MEDICAL RECORD SYSTEMS IN PUBLIC HEALTH FACILITIES IN KENYA: A CASE OF NAKURU COUNTY.

BY

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DECLARATION

This research project report is my original work and has not been presented in any other university.

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This project report is dedicated to my brother Kennedy Koech, nephew Ian Bet, Brian Kipchirchir and Alvin Kiprop for the great support, patience and inspiration during the study.

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ABBREVIATIONS AND ACRONYMS

AIDS:	Acquired Immune Deficiency Syndrome
CCC	Comprehensive Care and Treatment
EHealth:	Electronic Health
EMR:	Electronic Medical records
GPs:	General practitioners
HCWs:	Health Care Workers
HIS:	Health Information System
HITECH:	Health Information Technology for Economic and Clinical Health.
HIV:	Human Immunodeficiency Virus.
ICT:	Information Communication Technology
MCH	Maternal Child Health
MOH:	Ministry of Health
NACP:	National AIDS control programme
NHI:	National Health Insurance Fund
NHSSP:	National Health Sector Strategic Plan
NHIN:	Nationwide Health Information Network
HIEs:	Health Information Exchanges
OPD	Out-Patient Department
PEOU:	Perceived Ease of Use
PHI:	Patient Health Information
PII:	Personal Identifiable Information
PU:	Perceive Usefulness
TAM:	Technology Acceptance Model
SPSS	Statistical Package for Social Scientists
SMEs	Small medium entrepreneurs
WHO:	World Health Organization

ABSTRACT

Adoption of the information systems deployed at healthcare facilities by physicians is important in achieving intended effects of the systems, but many systems face adoption barriers. This study sought to explore factors that influence the adoption of Electronic Medical Record systems, years after its deployment in the provision of health services in Kenya by focusing on public health care facilities in Nakuru County. Electronic Medical Records assists in collecting and storage of patient's data which can be retrieved in summary form to give a brief overview of the patient's medical history. Electronic Medical Records applications can be able to show completeness; provide better ordering for searching and retrieving, and provide validity checks for data quality, research and especially decision support. The objectives of this study are; to determine the extent to which Capacity influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County, to examine the extent to which Infrastructure influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County, to assess the extent to which User Perception influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County and to establish the extent to which Workload influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County. Descriptive survey research design was adopted because it gives a description of the current state of affairs as it exists at present and describes "what exists" involving asking questions of why, where and when. The target population was all the public health facilities in Nakuru County where Electronic Medical Record systems has been deployed but not implemented. Therefore, Census was adopted in gathering the information from all the health facilities in the target population. To choose the participants from each health facility, purposive random sampling was applied which is a type of non-probability sampling (sometimes known as judgmental, selective or subjective sampling) which focuses on particular characteristics of a population that are of interest, thus, the sample size for this study was all the facilities in the target population. Based on theories from the Technology Acceptance Model (TAM), a conceptual framework for the adoption of Electronic Medical Record systems in healthcare facilities was developed. Questionnaires were dropped for the respondent to fill at their own convenient time. The study collected data with the use of a structured questionnaire and the data were coded, entered and analysed using descriptive statistics (frequencies, percentages, mean and coefficient of variation) with the aid of Statistical Packages for Social Sciences (SPSS) computer software. The results were presented in tables. The study was successful in addressing the study objectives and answering the research questions. It was established that Capacity, User Perception and Workload had an influence in the adoption of EMR. Following the findings the study recommends ICT curriculum be included in medical courses as this will give the medical practitioners ownership and confidence to use the technology, having a follow-up mentorship after the first formal training and finally having sufficient health care providers to meet the need of the ever increasing number of patient.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Health is one important sector in the economy of any country economy. A country that has poor health systems and policies is bound to experience poor economic growth as productivity of citizens might be greatly affected when they fall sick or die from curable cases. Despite the important role played by health sector, serious problems continue to be experienced. Many countries experience the problem of lack of enough money and resources to equip health institutions with technologies which are modern, poor health policies set that fail to address needs either short or long term, low budget allocated to the health sector etc. Therefore, in general, majority of the citizens are unable to access to healthcare services which causes a major problem. In developing countries quality of healthcare services is low due to scarcity of trained clinicians and majority of the citizens not able to afford high cost of healthcare services, and this are problems that can be alleviated by embracing eHealth in developing countries (Nyella & Mndeme, 2010)

Electronic Health (EHealth) covers the development and use of a wide range of ICT systems for healthcare e.g. electronic medical records, telemedicine, health information systems, mobile devices, e-learning tools and decision support systems. EHealth has value is in its ability to help lower costs in health sector at the same time delivering better care within a citizen centered approach. In addition, eHealth through the use of Personal Health Records (PHR) is a factor that is key in empowering patients; PHI will assist to play an active role in their own healthcare. Attempts to lower cost issues, expand access and improve the health quality governments in many developing countries are putting alot of hope in electronic medical records (Nyella & Mndeme, 2010) and ICT based Health Information Systems (HIS) (Mosse & Sahay, 2005). The migration to EMR is due to limitations in paper based records that include temporal, spatial, and monetary constraints associated with continued paper-based record accumulation and compression over time. Research on eHealth has shown that eHealth can be one of the solutions for providing better access to healthcare facilities for patients and healthcare professionals, improve collaboration between different governmental

bodies, and increase care quality (Khalifehsoltani & Gerami, 2010; Mostafa et al., 2010). According to a survey carried out by the World Health Organization (WHO), eHealth tools among them Electronic Medical Record (EMR) systems, are seen as extremely useful for 70% of the non-OECD (Organization for Economic Cooperation and Development) countries (WHO, 2006).

Electronic Medical Record (EMR) is a systematic collection of health information electronically about an individual patient or population. This record is available electronically to authorized health providers and the individual anywhere, anytime in support of high quality care by a way of network connection across different health care settings. This record is designed to facilitate the sharing of data across the continuum of care, across healthcare delivery organizations, across time and across geographical areas. The EMR typically contains information such as existing health conditions, physician visits, hospitalizations, test results, and prescribed drugs.

In United States of America for instance, $1.2 billion grant was unveiled to facilitate adoption of EMR in all hospitals by 2014. With the adoption of EMR, patient information will be electronically captured in any care delivery setting. This is aimed at increasing Health Information Exchanges (HIEs) and eventually maintaining a Nationwide Health Information Network (NHIN), which aims to provide a secure and interoperable health information infrastructure that allows stakeholders, such as physicians, hospitals, payers, state and regional HIEs, federal agencies, and other networks, to exchange health information electronically (Cline, 2012). In February 17, 2009, The American Recovery and Reinvestment Act was signed into law, providing $36 billion for health information technology. The U.S. government anticipates savings of $15 billion between 2016 and 2019 if adoption rates increase to 90 percent [Health Research Institute, 2009]. Physicians who contract with Medicare can receive up to $44,000 each in higher reimbursements for adopting certified EMR systems that are meaningfully used. The definition of meaningful use has not yet been finalized, but at a minimum, certified systems must be capable of providing clinical decision support, supporting physician order entry, capturing and querying information relevant to healthcare quality, and exchanging electronic health information from other sources [Health Research Institute, 2009]. A 2005 RAND study reported that 15–20

percent of U.S. physicians' offices and 20–25 percent of hospitals had adopted electronic record systems. However, in 2008, a national survey of almost 3000 physicians reported that only 13 percent of physicians had even a basic electronic records system and only 4 percent had a fully functional system with some inter-operation for prescriptions and images (Des Roches et al., 2008). In any case, adoption rates have remained low and, in fact, the U.S. adoption of electronic record systems trails European countries, substantially behind.

Transforming the health sector with enabling technologies is a major priority of the European Union member states. European Commission Council for health information, stated that "eHealth is today's tool for substantial productivity gains, while providing tomorrow's instrument for restructured, citizen-centred health care systems and, at the same time, respecting the diversity of Europe's multi-cultural, multi-lingual health care traditions. There are many examples of successful e-Health developments including health information networks, electronic health records, telemedicine services, wearable and portable monitoring systems, and health portals (European Union, 2005). One notable observation in Europe is that each country has its own distinctive approach in the journey towards enabling technologies in healthcare.

Germany is working on an Electronic Health Card (EHC) which will allow the physicians to check the administrative data of the patient and to write prescriptions on EHC. The EHC will also have voluntary medical functions like the emergency data record and later an electronic patient record that can be checked anywhere using appropriate card readers (Sunyaev et al., 2009).

Denmark leads the way in European eHealth and patient-controlled health records (Cruickshack et al., 2012). It boasts a universal Electronic Health Record system and a national PHR service available to any Danish citizen to allow them control who accesses their medical information and how it is accessed. Launched in 2003, the country's government-run PHR portal is Sundhed.dk, a website where, a citizen can view treatments and diagnoses from his/her own hospital patient record, book appointments with his General Practitioner (GP), renew prescription drugs, monitor own drug compliance, survey shortest waiting lists for operations and quality ratings of hospitals, register as organ donor, and get access to local disease management systems in out-patient clinics (Makori, Musoke

& Gilbert, 2013).

Canadian policy makers recognize the importance of the EMR (Canada Health Infoway and Health Council of Canada, 2006) and are currently working in partnership with federal, provincial, and territorial governments and an interprovincial agency aimed at coordinating EMR implementation efforts across Canada i.e. Canada Health Infoway, to develop an ambitious project for its implementation (Open Letter to Canadians). However, EMR implementation in Canada currently lags behind other industrialized countries (Silversides A, 2010). A recent study found that only 37% of Canadian family physicians use EMRs, ranking Canada last among the 11 countries surveyed (Schoen C et al., 2009)

In Kenya in 2001, the Mosoriot Medical Record System (MMRS) was developed. The project name was later changed to AMRS. The system serves 60,000 patients, and runs Microsoft Access on two networked computers. These are powered by an Uninterruptable Power Supply (UPS) and backed up with a solar battery. Patients register in the system on their arrival to the clinic and travel through the clinic with a paper visit form. In comparison with the clinic before and after the system was implemented, there were great improvements. Patients visits were 22% shorter, provider time per patient was reduced by 58%, patients spent 38% less time waiting in the clinic, clinic personnel spent 50% less time interacting with patients, 67% less time interacting with each other, and more time in personal activities. The downside is that clerks must perform the registration n and transcribe visit data, which is prone to errors.

Uganda also participated in the demonstration project in 2007, choosing three sites differing in size, location, and university affiliation: Mbarara Regional Hospital, Masaka Regional Hospital and Mbale Regional Hospital. Mbarara already had an MS-Access database for data copied from patients‟ clinic notes to support collaborative research with the University of California and San Francisco (UCSF). Mbarara was first to initiate the EMR system in January of 2007 employing seven Ugandan data entry technicians, a data manager, and one technologist, all with prior experience with their electronic chart abstracting database.

Leaders of the National AIDS control programme (NACP) in Tanzania expressed interest in participating in the EHR systems demonstration in the year 2005. They had already

implemented the paper –based HIV/AIDS registry and had since collected a core set of data on enrollment and at each visit, including vital signs, lab data, and treatments. Despite the presence of an electronic database for this registry, few of these forms had been entered into the database or analyzed; hence, there was scant information to support program management and strategic planning. NACP leaders in 2008, selected three sites varied in size, location, and experience with electronic data: a large referral hospital, -that had prior experience with an electronic national hospital data system, a district hospital located on the outskirts of Dar es Salaam and the site of care for AIDS-related malignancies located near the NACP offices in Dar es Salaam. Neither of the latter two sites had any experience with electronic records of any kind. The United Nations Development Program provided computers and net-work hardware for all Tanzanian sites, The NACP supported data entry and management, aided by an epidemiologic research grant to Indiana University. Because of high printing costs the desire for consistency with past data collection efforts, NACP leaders decided to forego the encounter forms developed5by the Tanzanian clinicians and instead use their existing HIV registry forms. The computing consultants created a Patient Summary Report containing identifying data, diagnoses (HIV-related and others), drug allergies, HIV-relevant lab test results, and HIV/AIDS treatment data.

With reference to the advantages given for having a digitized health system, some government hospitals have integrated the EMR systems into their work schedule but the big gap still lies in the trend of adoption of these systems by the health facilities and what challenges could they be facing in this adoption process (WHO, 2013)

1.2 Statement of the Problem

Healthcare, either in paper-based or digital format, is an information-intensive industry as for the industry to operate; it depends on the existence of patient health information (PHI) that is collected whenever a patient visits a healthcare centre. The collection of PHI for paper-based or traditional healthcare setup is different from the collection when records are in digital form. The latter is also referred to as e-healthcare. Contrary to paper-based healthcare setup where PHI is collected every time a patient visits a healthcare centre, in e-healthcare physicians collect Personal Identifiable Information (PII) only once and frequently update its related medical records. In general term, e-healthcare is related to computerization of

electronic healthcare services.

Recording of patient information in many hospitals in developing countries has been on papers where the clinician uses a template to record the patient's history, diagnosis and prescription. Limitations of these paper-based records include illegibility, ambiguity, incomplete data, poor availability and data fragmentation. Additionally, paper-based systems have limited functionality; many people cannot easily view the same record at the same time and these are some of the problems through which EMR seeks to address. EMR applications can prompt for completeness; provide better ordering for searching and retrieval, and permit validity checks for data quality, research, and especially decision support. Having EMR can support medical professionals in their decision-making and also improve operating efficiency, thus improving medical care quality.

Despite the well documented reports on the benefits of electronic health and the huge investment by the government(s) and the donor(s), adoption remains low in developing countries. These developed countries continue to face health threats characterized by HIV/AIDS pandemic, wide spread incidences of infectious diseases, high levels of infant mortality, low levels of life expectancy and now rising cases of lifestyle diseases such as diabetes and cancer (World Health Organization, 2013). Lack of readiness causes weakness of the health facility to undergo transformation during EMR implementation. Hence this study investigates and analyses the factors affecting the adoption of EMR in the healthcare industry, Nakuru County in particular.

1.3. Purpose of the Study

This study intended to investigate the factors influencing the adoption of Electronic Medical Record systems in public health facilities in Nakuru County, Kenya.

1.4 Objectives of the Study

i) To establish the extent to which Capacity influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County.

ii) To examine the extent to which Infrastructure influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County.

iii) To assess the extent to which User Perception influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County.

iv) To establish the extent to which Workload influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County.

1.5 Research Questions

i) To what extent does capacity influence the adoption of Electronic Medical Record systems in public health facilities in Nakuru County?

ii) How does Infrastructure influence the adoption of Electronic Medical Record systems in public health facilities in Nakuru County?

iii) To what extent does User Perception influence the adoption of Electronic Medical Record systems in public health facilities in Nakuru County?

iv) How does Workload influence the adoption of Electronic Medical Record systems in public health facilities in Nakuru County?

1.6 Significance of the study.

This study tried to find out what factors may be a hindrance to the adoption of EMR systems. The health care practitioners assist a big population of the people from day to day and therefore have a lot of data on the existing health situation at the grass root. It is of utmost importance for data collection to start from the community and the health facility level. This involves data collection on the delivered health services, the health needs of the community, any disease outbreaks and the prevention and curative steps taken. However, for most health care facilities their methods of collecting and recording this data are not cohesive with the current technological advances where data recording is moving from the paper recording system to the electronic platform appreciating the power of technology such as EMR systems but in return receive slow pace utilization.

Converted data is highly essential in the effective management of any organization and this comes in the form of merged and summarized information. Information on the quality of delivered service, available medical resources and on the problems encountered is vitally important in monitoring the progress of the delivery of health services and in planning future action. A properly organized health information system is an essential tool needed to provide summative, relevant and timely information in order to ensure quality service is offered. The ministry of Health will therefore be in a position to collect and analyse more data from the grass root level on the health status in the country and plan on future better and quality provision of health.

1.7 Delimitation of the study

Delimitation is the process of reducing the study population and area to a manageable size. This research was delimited in terms of the scope it covered. Participation of this study was delimited to public health facilities that have deployed but not implemented the use of EMR systems within Nakuru County. The study was also delimited to the factors influencing adoption of electronic medical records with critical examination of four variables namely: Capacity, Infrastructure, User Perception and Workload on the adoption of EMR systems.

1.8 Limitations of the study

This study concentrated on public health facilities in Nakuru County where EMR system has been deployed in one way or the other but has not been implemented as when seeing the patients, this makes the research limited in the sense that the findings cannot be generalized to other healthcare institutions that are privately owned and also, different health care practitioners have different operating environments.

The study also focused on the perceived factors that might be affecting EMR adoption rate.

1.9 Assumptions of the Study

This study involved examining the public healthcare facilities in Nakuru County that have deployed EMR systems and therefore the assumption is that the health care practitioners will be available to answer the questions that will guide this study, the respondents will be willing to participate and will be honest and unrestricted with their responses and finally the respondents will be conversant with the English language for ease of communication.

1.10 Definitions of Significant Terms used in the study.

Adoption of Electronic Medical record system:	Acceptance of the benefits and implementation of digitized patients record systems that are acceptable and use the technology for effective delivery.
Electronic Medical Records (EMR):	A real-time digital version of a patient's paper chart with applications that can be manipulated to analyze information of a patient's history and derive information instantly and securely to authorize users.
Healthcare systems:	The organization of people, institutions, and resources that deliver health care services to meet the health needs of target populations.
Infrastructure:	The basic equipment and structures that are needed for an organization to function properly.
Workload	The amount of work to assigned and expected to be accomplished by the physicians.
User Perception	Mental impression of how the physician understands, interprets or regards technology.
Capacity	The ability of the physicians to use electronic medical record system.
Public Health facilities:	These are the facilities that provide health based services to individuals.
Deployment:	All the necessary resources and equipment arranged and in place to implement a technology.

1.11 Organization of the Study

This research study was organized into five chapters where chapter one covered the background of the study, statement of the problem, purpose and objectives of the study, research questions, the significance, assumptions, limitations and delimitations of the study and definition of significant terms.

Chapter two covered the literature review of the study with outlook on conceptual framework and the scholarly works on EMR adoption in general and in Kenya. Themes studied: Capacity, Infrastructure, User Perception, Workload and their influence on EMR adoption.

Chapter three outlined the research methodology employed by the study; the research design, target population, sample size and sampling procedures, data collection and analysis methods and the ethical considerations and operational definitions of variables.

Chapter four presented the data analysis of the findings, presentation, interpretation and discussion under thematic areas and sub-sections in line with the study objectives.

Finally chapter five has the summary of findings, discussions, conclusions, recommendations and suggestions for further study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter summarizes the background importance of the factors that influence the adoption of EMR in healthcare service and delivery. Past reviews and results from other researchers who have carried out their research in the same field of study are also presented here and the conceptual framework which this research will be based on.

2.2 Background and importance of EMR

The Ministries of Health mandate is the provision of quality health services, promotion of equity in access, financial risk protection and overall governance and stewardship of the health sector. To execute this mandate there is an absolute need for information to guide policy making, intervention options, programming and effective management of health facilities and health districts. Over the years harnessing of this information has been a challenge both in the public and private subsectors. This has partly been due to the weak health information infrastructure, a poor information culture that does not spur demand for information, multiple and parallel information systems, a thin and stretched human resource to support data collection, transformation, presentation and archiving among others (Sumita, Takata, Ishitsuka, Tominaga, & Ohe, 2007).

It is with this background that the ministries through the Division of Health Information system (HIS) in Kenya undertook to develop a health information policy and strategic plan (2009- 2014) to guide the health information strengthening agenda in the country (Ministry & Health, 2010). In its Strategic Plan, the HIS has planned to improve data management and strengthen the use and application of information technology in data management. To effectively do this, there is need to develop standards that will ensure quality of software, compatibility of data sharing, ease of maintenance and common understanding among the workforce (Shachak & Reis, 2009).

Use of electronic health record (EMR) is becoming more and more common. It is anticipated that their use will improve patient care, decrease practice costs, and increase provider

productivity and revenue. Electronic medical record (EMR) will become an essential tool across many hospitals (Sumita, Takata, Ishitsuka, Tominaga, & Ohe, 2007). Many clinicians and policy-makers believe that the quality of medical care will increase through the use of EMR, through reductions in medical errors, increased availability of real-time information and decision support (Sequist et al., 2005). There is evidence that EMR can reduce duplicate or inappropriate diagnostic tests. EMR helps dramatically with data collection and access and use during an outpatient visit can improve overall satisfaction. This could be due to a number of reasons such as increased individualized treatment because of more quickly accessible and accurate patient information or by providing physicians reminders and alerts. The EMR supports outcomes of patients care. The EMR may improve healthcare delivery by facilitating physician communication about medications, enhancing documentation, increasing efficiency, and fostering information sharing and responsibility with patients (Shachak & Reis, 2009). EMR provides an obvious advantage over paper-based records because it allows providers to access patient records anytime and anywhere as long as they are able to log into the system.

Previous assessments of EMR systems in the country identified multiple electronic health data systems in use. Some of these systems were Excel sheets and statistical analysis software, typically developed primarily to address reporting, clinical trials, or other research applications. These systems did not qualify as EMR systems according to the basic functional requirements of an EMR system as defined in the *Standards and Guidelines for EMR Systems in Kenya* document. The goal of this review was to establish the completeness of compliance with the set standards and suitability of EMR systems reviewed, rather than to focus on their inadequacy. This would enable the MOH to work with the various implementing partners to develop upgrade plans, where required, to ensure that all systems being used in health facilities meet MOH requirements.

Data complexity, volumes of patients served and the desire to have efficient health information systems have defined the need for Electronic Medical Record (EMR) Systems in Kenya. EMR systems, when well developed and implemented, can improve the process of data collection resulting in better quality and more reliable health information. These systems can also greatly improve aggregation and reporting of data from facilities (Ministry & Health,

2010). EMR systems support provision of health care through the integrated clinical decision support functions and by ensuring that patient information is available across facilities for continuity of care. Coordination of development, deployment, implementation and maintenance of these systems is fundamental to their success in the health sector. This first edition of the *Standards and Guidelines for EMR Systems in Kenya* aims to provide guidance for the development of EMR systems for use in Kenya and set an environment for successful implementation and use of these systems. (Ministry & Health, 2010)

Since the year 2006, Kenya has conducted 3 assessments of EMR systems used in the country. These assessments focused on: general system characteristics of EMRs, hardware and infrastructure requirements, human capacity and perceptions, data use for clinical and managerial decision making, data reporting and output capabilities, data security and quality, and linkages with other systems. The assessments exposed several challenges to the implementation and use of EMR systems in Kenya. These challenges included: varying functionalities amongst systems, inability to share clinical information, inability to generate MOH defined reports and lack of supportive structures for successful implementations (Ministry & Health, 2010). Following the realization of these challenges, the MOH developed a roadmap to guide the implementation of systems in Kenya. This roadmap emphasized on the development of standards for EMR systems. In November 2010, culminated in the launch of the first version of the *Standards and Guidelines for Electronic Medical Record Systems in* Kenya by the MOH which defines the minimum functional requirements of EMR systems and provides guidance on the appropriate implementation to ensure sustainability. (Ministry & Health, 2010).

In line with the EMR roadmap, a review of systems against these standards was conducted in August 2011 to ascertain gaps between the standards and the systems as they are currently deployed. In some cases, systems in use presently have capabilities which are not used at specific facilities. The main aim of this review was to identify the strengths and gaps of the systems and subsequently draft upgrade plans with an overall aim of ensuring that all EMR systems primarily meet minimum functional standards and additionally, and explore factors affecting their implementation. This review is, additionally, an important step towards

enabling the attainment of the policy objectives of the Ministries of Health articulated in Kenya Vision 2030 (KV 2030) and article 43 (1) of the Constitution of Kenya which states in part that every person has the right to the highest attainable standard of health, which includes the right to healthcare services, including reproductive healthcare. To help operationalize this, the Ministries of Health recently launched the Kenya National eHealth Strategy 2011-2017. The automation of patient records through the use of Electronic Medical Records will play a crucial role in supporting the realization of the National eHealth Strategy.

It is expected that, following this review, and after the implementation of all developed upgrade plans, EMR systems recommended for use in Kenya will all meet the defined minimum MOH standards resulting in the realization of the benefits of using systems in supporting improvement in delivery of quality health services. In particular, the effective implementation of EMRs will:

1. Enable the capture of demographic and clinical health information;
2. Foster clinical decision support;
3. Enable order entry and medication prescribing;
4. Increase data security and confidentiality; and
5. Enable exchange of electronic information between providers, facilities and policy makers.

2.3 Influence of Capacity in the adoption of EMR

Information and Communication Technology (ICT) is revolutionizing our life, our ways to interact with each other, and day-to-day life and work. ICTs have made significant impact on healthcare industry in the globe. Its adoption and use, which result into e-healthcare, has transformed the way healthcare services are delivered. Its application in health is described broadly as eHealth, which includes telemedicine1, electronic medical records, and health information systems with decision support, mobile health and eLearning tools. EHealth has shown potential in facilitating a better health care delivery system, leading to better health and universal health coverage. It creates access, enhances quality, improves primary health care interventions and can act as a solution for situations where human resources for health are scarce (Shiferaw & Zolfo, 2012). Influenced by this transformation; medical errors and cost of delivering care have been reduced, while physician's efficiency and

physician-patient relationship have been improved. The identified benefits and many others have influenced several governments in developed countries to reserve huge amount of money for stimulating its adoption. (Omary, Lupiana, Mtenzi, & Wu, 2010)

Despite being outlined with these benefits, healthcare professionals still resist to incorporate computer technology while attending patients. These professionals prefer to write prescriptions for example by hand rather than using the technology more efficiently. The ICT resistance has been associated with a number of reasons. Healthcare professionals claim the whole process of obtaining patients records from a range of computer applications as not the clinical skill and wastage of time. (Omary et al., 2010). EMR are hi-tech systems including complex hardware and software, and therefore a certain level of ICT skills by the users (the physicians) is required. Furthermore, there are some capacity (technical) problems with EMRs, which lead to physicians complaining, and therefore need to be improved. This is because barriers exist which is related to the capacity capabilities of the physicians and the capacity issues of the systems.

2.3.1 Lack computer skills and adoption of EMR

Based on surveys many researchers have concluded that physicians have insufficient skills and technical knowledge in dealing with EMRs, and that this has resulted in resistance (Jha et al, 2009). EMR system is actually very complex to use by the physicians and providers do appear to underestimate the level of computer skills required from these physicians. Further, physicians require good typing skills to enter patient medical information, notes and prescriptions into the EMR system, and some physicians lack them. As it is not only the physicians but also other staff at medical practices lack adequate computer skills and these needs to be improved. Most of healthcare workers in Tanzania are Nurses and Midwives and other healthcare workers, and these groups form 80 percent of overall healthcare workers. Unfortunately, these workers lack computer skills as well as general skills for the use of E-healthcare information systems. (Omary *et al*, 2010) attributes low adoption of eHealth among developing countries to lack of computer skills amongst the clinicians.

According to (Malik *et al,* 2008) sluggish internet use among doctors in Pakistan was due to unavailability of proper technology and lack of computer training. (Hogan & Palmer, 2005)

are of the opinion that those health care professionals who lack the ICT skills of processing the online health data end up spending too much time on the same. Without adequate ICT skills, user involvement in selection and development of ICTs becomes difficult and if it happens, it is only to rubberstamp the experts‟ decisions. This might lead to having eHealth technologies that are not widely accepted or used adequately. (David Muchangi Mugo, 2014). For a successful implementation of e-healthcare in the world, computer skills to all healthcare professionals and staff involved in the process is a must. (Omary et al., 2010)

2.3.2 Lack of technical training & support and adoption of EMR

The routine use of EMR has an impact on medical training as recently qualified practitioners had all trained with one or several EMR systems and consequently appeared more comfortable in using or switching from one system to another (Avery, Cantrill, & Sheikh, 2005). Yet, even recently qualified practitioners had some difficulties and reservations when using their practice EMR which raises the question of whether further CT training would be a useful addition to their medical training? The lack of ICT skills among practitioners has been identified as a safety concern in other studies. A previous study by Morris et al. suggested that – although practitioners in primary care trusts in England ranked patient safety highly – they often had insufficient knowledge and training to make optimum use of embedded clinical decision support features of their computer systems (Morris, Savelyich, 2005)

Physicians do regard the EMR system as extremely complicated and this is due to lack of general training and support for problems associated with the EMRs (Randeree, 2007). (Ludwick & Doucette, 2009) similarly notes that physicians struggle to get the necessary and appropriate technical training as well as support for the systems from the vendor. Considering that physicians are not technical experts and the systems being inherently complicated, physicians perceive a need for proper technical training and support, which leads to the physicians getting reluctant to use EMR system without it. For developing countries (Sood et.al, 2008) identifies lack of training in ICT and computer illiteracy as the source of healthcare professionals‟ resistance. As a short-term solution, in service training is the appropriate way to ensure availability of the required skills at the required time. To support this, WHO (2006b) highlighted the need for a basic form of training if e-healthcare

has to be implemented in a country. In the long-term, healthcare institutions, where Nurses and Midwives and other healthcare workers are trained, should incorporate e-healthcare syllabus to its respective courses (Omary et al., 2010).

Training boost awareness and confidence level as users are able to overcome technophobia while relating usage to expected benefits (Sahay & Walsham, 2006). Abraham *et al* (2011) add their voice by arguing that optimal use of IT towards the transformation of health care requires IT knowledge in the medical communities. The clinicians must also understand their benefits and how they will impact on routines and business processes in hospitals, a challenge that can be overcome by including ICT in the curriculum of medical courses offered in developing countries (David Muchangi Mugo, 2014).

Most physicians consider EMRs to be challenging in the use because of the multiplicity of screens, options and navigational aids (Ludwick & Doucette, 2009). Physicians have to allocate time and effort to learn how to use the EMR system effectively and efficiently which they may see as a burden if they are to master the usability of the EMR system considering the complexity problem associated with EMR systems including lack of skills which leads to the physicians regarding the EMR system as extremely complicated and therefore requiring training of the EMR system.

2.3.3 Lack of mentorship and adoption of EMR

Although initial formal training is depicted favorably by some, insufficient training is often identified as a barrier, either because there is not enough training or because classroom training was ill-suited to physicians' clinical needs and learning styles. Physicians complain about their training and post-sale experience with the vendor. Instead of a training regimen similar to that described in the literature, physicians report that the vendor simply offer one training session of one half to a full day in duration. Training is often too soon after implementation where physicians have not developed sufficient experience with their new EMR to ask relevant questions or appreciate the answers. Physicians report that they don't always access the vendor's technical support anytime they required after the EMR is deployed, and hence becomes a challenge in implementing the EMR adoption. It's necessary that a follow-up mentorship happens more often so as to fully embrace and implement the EMR system.

2.4 Influence of Infrastructure in the adoption of EMR

EMR systems provide the basic infrastructure upon which other electronic health solutions can be laid. EHealth infrastructure pertinently affects adoption of eHealth (Ouma & Herselman, 2008; Qureshi *et al.*, 2013). In a study conducted in Kenya, which focused on adoption of ICT in SMEs in the health sector, quality of ICT systems is noted as a significant factor in determining adoption of ICT (Muathe, Wawire & Ofafa, 2013). In another study conducted in Kenya, it was revealed that doctors are willing to conduct e-searches in order to access and share health information with their colleagues in others parts of the world. However, insufficient ICT resources limit them in performing the searches (Gatero, 2010). According to a study conducted by MicevskaMaja (2005), which focused on the complementarities that exist between information technologies and public health promotion based on two countries, Bangladesh and Lao, the stock of telecommunication infrastructure plays a key role in public health. Transmission of health information between health institutions, health institutions and patients, health institution and third parties such as insurance companies, patients and health institutions is negatively affected if telecommunication and internet penetration is low (David Muchangi Mugo, 2014).

2.4.1 Interconnectivity and adoption of EMR

EMR software and hardware cannot be used straight "out of the box", and therefore to generate the desired benefits it has to be interconnected with other devices to "complement" it. Such interconnectivity problems is a major obstacle to the wide adoption of EMR systems (Menachemi, Langley, & Brooks, 2007). In essence, EMR systems are not compatible with the existing practice systems that physicians are used to, and therefore physicians are reluctant to get rid of functional systems they already have in order to have an integrated system and this includes EMRs (Davidson & Heslinga, 2007; Kemper, Uren, & Clark, 2006). Further, (Valdes, Kibbe, Tolleson, Kunik, & Petersen, 2004) concluded based on a survey that due to the lack of consistent data standards within the industry, the format of data varies among the different software packages and systems and this makes data exchange difficult if not impossible between systems (Simon, Kaushal, Cleary, Jenter, Volk, Orav, et al., 2007). This is because there were more than 264 unique types of EMR software implementations in use and therefore because of the relatively limited organizational

resources such as expertise and experience this problem is more acute in smaller practices than in larger ones

According to the International Telecommunication Union, ITU, (2007), by the year 2006, the Internet penetration in Tanzania was 1 percent of the population compared to 6.0, 7.9 and 10.5 percent of the population in Nigeria, Kenya and South Africa respectively. The low rate of internet penetration and low bandwidth are among the challenges to eHealth adoption in developing countries. (Omary *et al* (2009) points out that due to poor ICT infrastructure and internet penetration in Tanzania, the majority of areas in the country cannot support internet deployment, which in turn, hampers eHealth adoption. Therefore, since EMRs need to be shared between physicians located in different healthcare facilities, these factors subsequently hinder its adoption and use. Even in developing countries and urban areas that have high internet penetration, bandwidth may still be a challenge as it is low which again hampers its utilization, thereby limiting adoption of telemedicine and other internet based eHealth applications.

As long as internet penetration remains low in developing countries, adoption of eHealth will continue to lag behind compared to countries with high adoption rates such as Denmark (broadband connection per household in Denmark stands at 83.9% according to OECD (2013)). However, to fully realize the importance of internet for accessing healthcare information there are some issues that must be addressed, for example, poor internet skills on the part of healthcare professionals prevent them to understand the difference between biased and unbiased information, to differentiate evidence-based claims, and to interpret the information which is meant for health professionals (Qureshi *et al.*, 2013). A study conducted in Kenya focusing on establishing the infrastructural barriers to eHealth implementation in developing countries, Qureshi *et al* (2013) indicates that internet connectivity is vital for successful adoption of eHealth.

2.4.2 Lack of computers/hardware and adoption of EMR

Computer infrastructure is the backbone to e-healthcare services implementation. Sufficient quantity of hardware is required in order to use the EMR systems, which includes phone lines, computers and internet connections. Lack of these 'basic' facilities/hardware blocks the

widespread adoption of EMR system as they needed to support EMR implementation (Vishwanath & Scamurra, 2007). Therefore, considering the fact that setting up EMR systems will require more resources the start-up costs will be higher and as a consequence, only a few researchers directly refer to the unavailability problem of computers/hardware. In a study conducted by (Ouma & Herselman, 2008), it is indicated that cost of computers and lack of computers hinder adoption of eHealth amongst hospitals in the rural areas. Additionally, the government has to control computer and computer systems prices, so that the majority of people can possess them, as well as controlling Internet access costs. (Omary et al., 2010)

2.4.3 Physical Security Concerns and adoption of EMR

Lack of physical security creates a resistance to the adoption of EMR systems. A secure facility is a physical location engineered with controls designed to minimize risk of attacks from physical threats. All Computer labs should be secured through cabling, locks, grilled windows and doors etc., to enhance physical security. Access to the lab facility should be monitored either through electronic means (card swipe, security camera, web cam, etc.) or by a designated lab monitor technician and lack of this becomes a barrier to the widespread adoption of EMRs (Ford EW et al., 2006). The computer chassis should be arranged so that there is not easy access to where hardware devices could be installed and not obviously visible. In addition, physical checks of the lab workstations for unauthorized attached devices should be conducted frequently (Chronaki et al., 2007; Randeree, 2007).

2.5 Influence of User Perception in the adoption of EMR

Physician's perceptions, knowledge and personal issues is a major concern regarding the use of EMR systems. The physicians concern about loss of professional autonomy and their perceptions of the questionable quality improvement associated with EMRs is a big worry to the physicians.

2.5.1 Lack of belief in EMRs and adoption of EMR

More than half (58.1%) of the physicians without an EMR have doubts that EMRs can improve clinical outcomes or patient care according to (Kemper et al., 2006). As asserted by other researchers those who are not willing to use the EMR system are skeptical about claims

that the system will successfully improve the quality of medical practices (Jha et al., 2009). This therefore creates a personal resistance to the wide adoption of EMR systems. Physicians are generally afraid of change and doubt its necessity but as it is, implementing EMR systems does mean a change in working styles for physicians. Further, the physicians' perceptions of EMR systems are affected by the social influences around them thus their skepticism and negativity.

2.5.2 Need for control and adoption of EMR

Professional autonomy which is defined as "professionals having control over the conditions, processes, procedures, or content of their work"(Walter & Lopez, 2008), plays a very important role in the working practices of physicians which will then not be possessed or evaluated by others. Therefore, physicians are concerned about the loss of their control of patient information and working processes by the implementation of EMR systems, since these data will be assessed by others and shared with others. As stated by (Walter & Lopez, 2008) physicians' perceptions are very important in their reaction to EMR adoption of the threat to their professional autonomy.

2.5.3 Productivity and adoption of EMR

Loss of clinical productivity and decreased job performance, particularly during the transition period to an EMR system, has been perceived as barriers (Randeree, 2007) and concerns about consequent costs are often associated with this factor. According to (Simon, Kaushal, Cleary, Jenter, Volk, Poon, et al., 2007) nurses stated that increased time spent interacting with the EMR system decreased their job performance because they spent less time with patients; however, this same study also found that nurses perceived EMRs as improving workplace productivity due to better access to and organization of patient care information.

2.6 Influence of Workload in the adoption of EMR

Physicians, other health care professionals and managers‟ lack of time and workload are important barriers to EMR implementation. Studies involving health care professionals made more general statements about heavy workloads (Greenhalgh, Wood, Bratan, Stramer, & Hinder, 2008) and EMR use as being time-consuming (Chronaki et al., 2007; Randeree, 2007)

and concerns that EMR implementation would take time away from physicians‟ clinical tasks. Studies about managers expressed concern about EMR use increasing physician workload (Miller & Sim, 2004). A fluent workflow is considered very important in the work of physicians, and therefore they perceive that introduction of EMRs will slow their workflow as it will always lead to additional time being required to implement, enter data and learn how to use the EMR system. As a result, their workload will be increased and their productivity will be reduced. This can also cause financial problems such as a loss of revenue. Workload can be viewed in the following dimensions:

2.6.1 Number of Patients and Health care workers and adoption of EMR

Our health care system is increasingly recognizing the importance of improving patient access to care and is embracing the principles of advanced access, or "same-day scheduling." Access improvement depends on correctly matching patient demand with appointment supply without a delay (Lewandowski et al., 2006) and without harming continuity of care. (Saultz & Lochner, 2005). In other words, it means seeing patients when their needs arise, not bumping them to another day or to another provider. Patient turnover, or throughput, through the healthcare facility can significantly impact the workloads of HCWs. Research has shown that when HCWs staffing is more favorable, patient outcomes are more favorable and managed well.

2.6.2 Time to learn the system and adoption of EMR

In order to implement the EMR system, physicians need to spend their time and effort to learn how to use the EMR system but this becomes a challenge due to the demands and pressures of delivering hospital-based care (Simon, Kaushal, Cleary, Jenter, Volk, Orav, et al., 2007). Therefore due to this situation, physicians report that they lack the time to learn, as this would increase their workload and slow down their workflow. However, other researchers argue that for the physicians to work more efficiently they need to master an EMR system (Meade, Buckley, & Boland, 2009) and also, to demonstrate the value of learning and mastering the system, benefit-effort analyses are required.

2.6.3 Time required to enter data and adoption of EMR

Data-entry is a widely experienced barrier among physicians for physicians using EMR

systems (Loomis, Ries, Saywell, & Thakker, 2002; Menachemi et al., 2007). Based on Loomis's (2002) research, data entry is both cumbersome and time-consuming as stated by more than half of the EMR users. This can be related to the inability of physicians to not properly handle the system due to the complexity of the system.

2.6.4 More time per patient and adoption of EMR

Many physicians report that sometimes it is more efficient and convenient to use paper records during the clinical encounter with the patients because using EMR systems will take more time for each patient. In using EMR systems, physicians may be required to stop halfway through a consultancy for them to enter information on the system for example patient's diagnosis or type a prescription and this will definitely disrupt the flow. In addition, considering the fact that physicians are slow in their typing skills and entering this information will cost more time for each patient visit. (Pizziferri et al., 2005) carried out focusing on this issue, a time and motion study on physicians' time utilization after and before implementation of an EMR system, and was able to find that most physicians do spend more time on documentation after the clinic sessions and were able to avoid sacrificing time with patients or overall clinic time (Pizziferri et al., 2005). The same study also pointed out that using EMR systems increases a physician's workload given the technical problems such as the complexity of EMR systems and also physicians' lack of computer skills and, an EMR system's ease of use is a key element in the efficiency and acceptance of such systems.

2.6.5 Time to convert patient records and adoption of EMR

Implementing an EMR means transferring records between the two systems i.e. switching from doing paper-based records to electronic-based record systems. Based on (Davidson & Heslinga, 2007), some physicians are only comfortable with the summaries they themselves make (Handwritten notes, histories) and they regard the task of record conversion as their own responsibility because of the cost burden and the time associated with record conversion. This therefore outweighs any potential benefits acknowledged of EMR systems. As a result, integration of EMRs in medical practices and the increase of a physician's workload becomes a barrier due to the time required to convert records.

2.7 Theoretical Framework

Emerging information technology cannot deliver improved organizational effectiveness if it is not accepted and used by potential users. This research study will be based on the Technological Acceptance Model (TAM).It was introduced by Fred Davis in 1986 and specifically tailored for modeling user acceptance of information systems. TAM is an adaptation of the Theory of Reasoned Action (TRA) by Davis in 1989. It is one of the most successful measurements for computer usage effectively among practitioners and academics. TAM attempts not only for prediction but also for explanation to help researchers and practitioners identify why a particular system may be unacceptable and pursue appropriate steps. The purpose is to assess the user acceptance of emerging information technology. An important factor in TAM is to trace the impact of external factors on internal beliefs, attitudes and intentions. Two particular beliefs are addressed through TAM i.e. Perceived usefulness (PU) and Perceived ease of use (PEOU). Perceived usefulness (PU) is the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context. Perceived ease of use (PEOU) is the degree to which the prospective user expects the target system to be free of effort. These beliefs influence the behavioral intentions of accepting and adopting a technology system. Between these two, perceived ease of use has a direct effect on both perceived usefulness and technology usage (Adams et al., 1992; Davis, 1989). Davis (1989) also found that there is a relationship between the beliefs that users have about a technology's usefulness, the attitude and the intention to use the technology. In his study he found perceived usefulness to exhibit a stronger and more consistent relationship with usage than other variables.

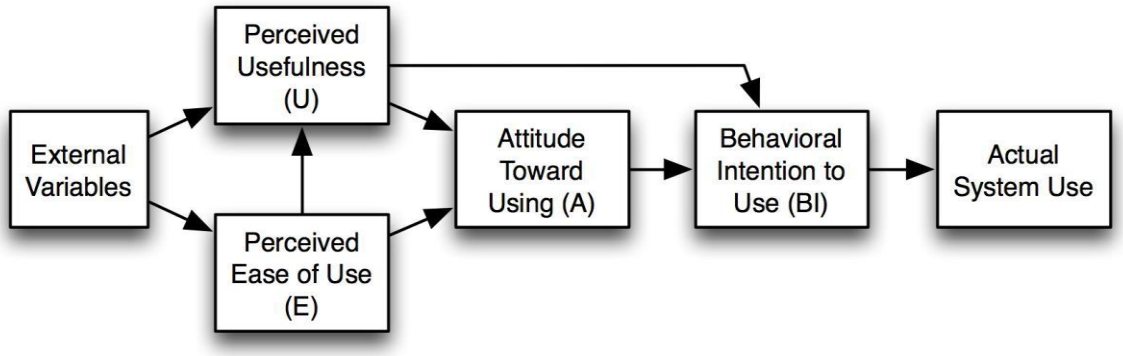

Figure 1: Technology Acceptance Model

(Bagozzi, Davis & Warshaw, 1992) asserts , people form intentions and attitudes toward trying to learn to use a new technology prior to initiating efforts and this is because new technologies e.g. personal computers are complex and decision makers have an element of uncertainty exists in their minds with respect to the successful adoption of technology. Intentions and attitudes towards the usage may be lacking or ill-formed in conviction and may only occur after preliminary strivings to learning the technology use evolve. Thus, such attitudes and intentions may not be a direct or immediate consequence of actual usage. Therefore the aim of this study is to test how TAM applies in predicting the attitudes and intention to use EMR systems among current users and future users.

2.8 Conceptual Framework.

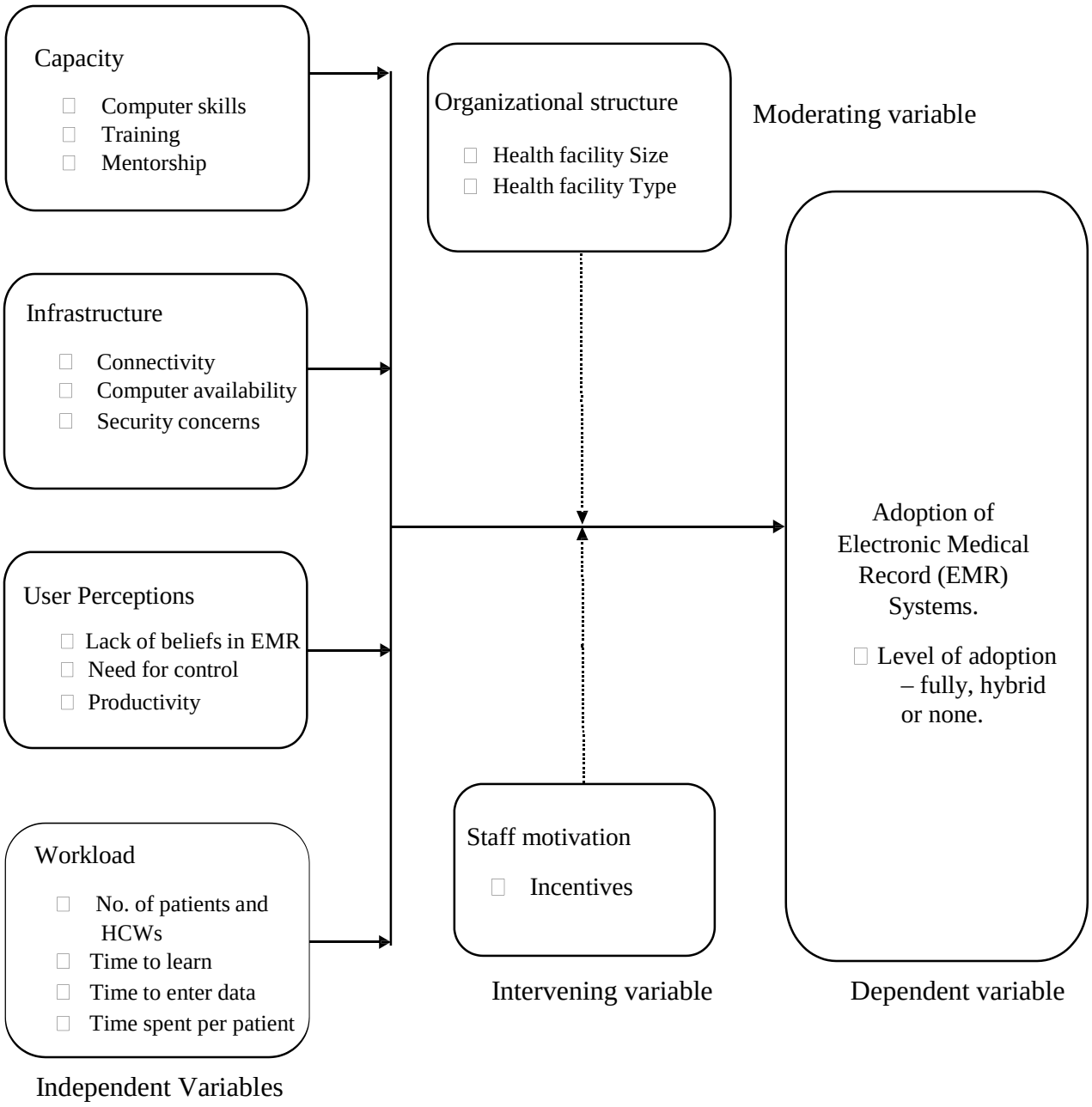

Figure 2: Conceptual Framework Model

2.9 Knowledge Gaps

The studies that have been done on the adoption of EMR systems in healthcare i.e. (Vishwanath A, Scamurra SD, 2007) found out that accessibility to ICT infrastructure could be a barrier to adoption. Internet connections, computers and phone lines are required in the use of EMR systems and lack this 'basic' facilities/hardware hinders EMR implementation (Laerum H, Ellingsen G, Faxvaag A, 2001). In such practices, the researcher sought to find if accessibility to ICT infrastructure is linked to the poor adoption of EMR since computers and printers are in the market. A study done by (Loomis GA *et al*., 2002) found out that despite computer skills being taught in the present day and becoming part of everybody's everyday life, its adoption for service delivery has been met with a number of challenges. There was need to focus on the lack of training and follow-up mentorship of the system that could lead to even those who have ICT knowledge to find it difficult to adopt, and also if including ICT in the curriculum of medical courses offered in developing countries (David Muchangi Mugo, 2014) will assist in the adoption of EMR by the physicians.

2.6 Summary of Literature Review

This chapter reviewed literature on factors influencing adoption of EMR systems in public facilities. The literature was divided basing on the variables of the study which included capacity, infrastructure, user perception and workload. The foregoing literature has managed to show that heavy workloads and EMR use as being time-consuming and concerns that EMR implementation would take time away from physician's clinical tasks. The studies have also revealed that the greatest barrier of EMR implementation faced by the physicians is the need for control as they are comfortable only with the summaries make themselves such as handwritten clinical notes and histories and also, the switching between the two systems from paper-based to electronic-based systems which involves transferring records. The theoretical framework linking the variables identified in the study was also reviewed in this chapter and concludes by identifying the conceptual framework and knowledge gaps.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter presented the research design to be used, target population for the study and the sample size used. It also explained the data collection procedure, analysis and research instruments the study adopted. It also focused on validity and reliability of instruments and ethical issues.

3.2 Research Design

This study employed the descriptive survey research design where self-administered questionnaires were used for data collection. Descriptive surveys portray an accurate profile of persons, events, or situations (Robson, 2002). Kothari (2004) describes descriptive surveys as formalized and typically structured fact-finding enquiries, involving asking questions (often in the form of a questionnaire) of a group of individuals, adding that the major purpose is description of the current state of affairs as it exists at present and describe "what exists" with respect to variables or conditions in a situation. (Mugenda & Mugenda, 1999) states that a descriptive survey design determines and reports the way things are or answers questions concerning the current status of the subjects in the study. Therefore, the descriptive survey was deemed the best strategy to fulfill the objectives of this study. The design takes on a case study of public facilities in Nakuru that have deployed but not implemented EMR.

3.3 Target Population

The target population was the public health facilities in Nakuru County that have already deployed but not implemented EMR. This study focused on the 13 public health facilities in Nakuru County. The accessible population of this study was 91 participants who were chosen because they are privy to the information that influences the decision to adopt EMR and will include senior health managers (the Nursing officer in-charge and head medical officers) and service providers.

The table below shows the total number of participants in the study.

Table 1: Population size

Sample	Number per Institution	Number of institutions	Total Number Participants
Senior health managers	2	13	2
Health service providers	5	13	6 5
Total			**91**

3.4 Sample size and Sampling procedure

Sampling is the process of selection of appropriate number of subjects from a defined population (Chalmers, 2002). Mugenda and Mugenda (2003), states that it is advisable to take the whole population where the sample is small to make the study meaningful, such as is the case in the present study. Nakuru has 13 public facilities that have EMR deployed. Therefore, Census was adopted in gathering the information from all the health facilities in the target population. To choose the participants from each health facility, purposive random sampling was applied to select 2 senior health managers i.e. the nursing officer in-charge and head medical officer from each health facility and one health service provider from each of the 5 departments in the facility i.e. Comprehensive Care Clinic (CCC), Maternal child health (MCH), Out-patient department (OPD), Laboratory and Pharmacy. The sample size was 2 *13= 26 senior health managers and 5 * 13= 65 health service providers. The design was preferred since the target population was small and manageable.

3.5 Research Instruments

Data was collected through the use of questionnaires to be administered in the field to the sampled respondents. The questionnaire was divided into six sections. The first section of the questionnaire was an introduction and it explained the purpose of the questionnaire stating clearly that data to be obtained was for pure academic purpose. It also explained the instructions on how to answer the questions eliciting the basic information of the participants and the health facility. The other sections contained the questions used for examining the factors influencing the adoption of EMR system.

3.5.1 Piloting of the Research Instrument

A pilot questionnaire was administered prior to the main study to a group of 10 respondents with similar dynamics as the final respondents selected on convenience, for the purpose of correcting the questionnaire and eliminating potential problems. Test re-test method was used to pilot the research instrument. Respondents used in the pilot study were not included in the final study. Once the researcher was satisfied with the results, the instrument was relayed for use in the actual study.

3.5.2 Validity of the instrument

According to Mugenda and Mugenda (2003), Validity is the accuracy and meaningfulness of inferences, which are based on the research results. For a data collection instrument to be considered valid, the content selected and included must be relevant to the need or gap established. The validity of the instrument was checked in terms of how the questionnaire was constructed and the content of the questionnaire. This is to ensure the questions were structured in an understandable way clear to all and respondents able to interpret all questions in the same way without any bias and the responses finally help answer the research questions.

3.5.3 Reliability of the instrument.

Mugenda and Mugenda (1999) defines reliability as a measure of the degree to which a research instrument yields consistent results or data after repeated tests when administered a number of times. This measures the extent to which a research is replicable. It also refers to the situation where "the results of a study can be reproduced under similar methodology" (Joppe, 2000). In this study, the main instrument of measure was a questionnaire that was administered in the public health facilities in Nakuru County that have deployed EMR but not implemented. To strengthen the reliability of the tool, the study used of internal consistency techniques. This involved correlating a score in one item with scores obtained from other items in the instrument. The study used the Cronbach alpha to measure the internal consistency of results across items within a test i.e. how closely related a set of items are as a group. The Cronbach alpha was interpreted as the mean of all possible split-half coefficients and it was considered to be measure of scale reliability.

Note that a Cronbach reliability coefficient of .70 or higher will be considered "acceptable"

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{i=1}^{K} P_i Q_i}{\sigma_X^2}\right)$$

Where;

α= reliability of coefficient of internal consistency K= number of items used to measure the concept σ_X^2 = variance of the observed total test scores

$\sigma_{Y_i}^2$ = variance of individual items

i = Current sample of person

A coefficient of 0.89 was obtained from the measurement and this meant that the tool had a strong internal consistency.

3.6 Data Collection Procedure

Ethical considerations was clearly communicated and adhered to before commencement on the data collection process. The entire data collection and analysis exercise was expected to take approximately 2 weeks. Prior to the commencement of data collection, an introductory letter was sent to the respondents to request them to participate in the study. The questionnaire was dropped for the respondent to fill at their own convenient time once the respondents agree to undertake the study. The researcher intended to collect data from 13 registered health public facilities in Nakuru County.

3.7 Data Analysis Technique

Quantitative technique will be used for analysis. The variables will be coded and entered in Statistical Packages for Social Sciences (SPSS) version 20.0 computer software. The data collected were coded, edited for errors and the analyzed. The data obtained from the research instruments was analyzed by use of descriptive statistics mainly frequencies, percentages, mean and correlation coefficient. The results were presented in tables for easier interpretation.

3.8 Ethical Considerations

The researcher was able to seek permission from relevant bodies and letters from the authorities was appended to the research project before data collection assuring the respondents that the research was purely for academic purposes. The study ensured that the confidentiality of the respondent's information was upheld. The research processes and procedures used were based on a voluntary informed consent and the researcher further ensured that the results were generalized without referring to a specific health facility.

3.9 Operational definition of variables

This is the description of variables, term or object in a manner that is accessible and measurable by other persons independently (Kish, 2011). Operationalization refers to the translation of concepts into tangible indicators of their existence (Saunders et al, 2009).

Table 3.3: summarizes the operational definitions of variables that were used in this study.

Research Objective	Variable	Indicator(S)	Measurement	Scale	Tools of analysis	Type of analysis
To determine the extent to which Capacity influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County.	Independent Variable	Computer skills	Number of health care practitioners who have none, basic, mid-level and advanced computer skills in MS word, MS excel and MS access.	Ordinal	Descriptive (Frequencies, percentages, Mean), correlation coefficient	Quantitative
		EMR Training	Number of health care Workers who have been trained on the EMR software.			
		Mentorship	Follow-up mentorship done after the initial training on EMR software.			
To examine the Extent to which Infrastructure influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County.	Independent Variable	Connectivity	Availability of internet, software and hardware interconnectivity.	Ordinal	Descriptive (Frequencies, percentages, Mean), correlation coefficient	Quantitative
		Computer availability	Availability of computer systems.			
		Security concerns	Availability of secure rooms with controls designed to minimize risk of attacks from physical threats.			
To assess the extent to which User Perception influence the adoption of Electronic Medical Record systems in public health facilities in Nakuru County.	Independent Variable	Lack of beliefs in EMR	How the health care practitioners perceive the EMR system to improve the quality of patient care.	Ordinal	Descriptive (Frequencies, percentages, Mean), correlation coefficient	Quantitative
		Need for control	The EMR system taking control of patient information and working processes.			
		Productivity	Perception of health care Practitioners in EMR system in terms of job performance.			
To establish the extent to which Workload Influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County.	Independent Variable	No. of patients and HCWs	How the number of health care workers vs. the daily patients affect the daily workload.	Ordinal	Descriptive (Frequencies, percentages, Mean), correlation coefficient	Quantitative
		Time to learn	Time they are willing to spare to learn the system.			
		Time to enter data	Time taken to enter historical And current patient information into the EMR system.			
		Time spent per patient	Time taken to attend to each.			

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter presents data analysis, presentation and interpretation of the data on the study. It will focus on the response rate and the factors influencing the adoption of EMR systems in public health facilities which will be organized according to research questions.

4.2 Questionnaire Response Rate

Out of the 91 questionnaires distributed, 72 were correctly filled and returned which represents a response rate of 79 percent. Mugenda and Mugenda (2003) argued that a response rate of 50 percent is adequate, a response rate of 60 percent is good, and a response rate of 70 percent is very good. Therefore, the 79 percent response rate reported for this study formed an acceptable basis for drawing conclusions.

4.3 Demographic Characteristics of the respondents

This section focuses on the gender, age group, level of education, department of work, years worked, level of adoption and level of competence. This information aimed at testing the appropriateness of the respondent in answering the questions regarding the factors influencing the adoption of Electronic medical record systems in public health facilities in Kenya.

4.3.1 Distribution of the respondents by Gender

An item was included in the questionnaire which sought information on the gender of the participants. The studies revealed that majority of the participants were male. Table 4.1 represents the participants by gender.

Table 4.1 Distribution of the respondents by Gender

Gender	Frequency	Percentage
Male	39	54.2
Female	33	45.8
Total	**72**	**100.0**

The study revealed that 54.2 % of the respondents were male while 45.8 % of the respondents were female. As shown in table 4.1, both genders were visible in the study.

4.3.2 Distribution of Respondents by Age group

The study sought to establish the age of the respondents in order to find out if age characteristics are important for the study and if age of respondents would influence adoption. This being a new technology, it is believed that the younger population would be more receptive to technology hence the need for age analysis. The results are as shown in table 4.2

Table 4.2 Distribution of the respondents by Age group

Category	Frequency	Percentage
Under 29 years	8	11.1
30 – 39 years	37	51.4
40 – 49 years	27	37.5
Total	**72**	**100.0**

Out of the 72 respondents, 45 (62.5%) are below 40 years. This shows that the majority of the respondents are in the age group that is viewed as being technology receptive.

4.3.3 Distribution of Respondents by levels of education

The study sought to establish the level of education of the respondents in order to find out if the academic qualifications of the health care practitioners would influence adoption. This being a new technology, it is believed that the learned population would be more receptive to technology the results are as shown in Table 4.3.

Table 4.3 Distribution of the respondents by levels of education

Category	Frequency	Percentage
Certificate	1	1.4
Diploma	44	61.1
Graduate	18	25.0
Post Graduate	9	12.5
Total	**72**	**100.0**

Out of 72 respondents, 1 (1.4%) had certificate qualifications as their highest level of education, 44 (61.1%) had diploma qualifications as their highest level of education, 18

(25.0%) had graduate as their highest level of education whereas 9 (12.5%) had post graduate as their highest level of education. This shows that the target population comprised of learned people.

4.3.4 Distribution of respondents by years of experience

The study also sought to establish the number of years of health care provision that the respondents had; therefore the respondents were asked to state the length of years of service in the health facility. The results are presented in Table 4.4 below.

Table 4.4 Distribution of the respondents by years of experience

Category	Frequency	Percentage
Less than 1 year	7	9.7
1 – 5 years	55	76.4
6 – 10 years	10	13.9
Total	**72**	**100.0**

Out of the 72 respondents 7 (9.7 %) of the health care practitioners have worked for less than one year, 55 (76.4 %) between 1 and 5 years and 10 (13.9 %) had worked between 6 and 10 years of experience. From this analysis, majority of the healthcare providers have more at most five years of experience. This showed that all the health care practitioners had a knowledge basis of patient interaction.

4.3.5 Distribution of Respondents by level of adoption

The study sought to establish the current systems being used by the health care facilities to record patients' data. This was done to determine the current status of adoption by the public health facilities. The distribution results are as shown in table 4.5

Table 4.5 Distribution of the respondents by level of adoption

Category	Frequency	Percentage
Fully electronic	15	20.8
Hybrid (Both)	26	36.1
None (Fully paper-based)	31	43.1
Total	**72**	**100.0**

Out of the 72 respondents 15 (20.8%) reported that they had fully implemented and integrated EMR systems in their practice, 26 (36.1%) are currently using hybrid system i.e. both paper and electronic systems while 31 (43.1%) are not using any electronic record system. This results show that majority of the health facilities had adopted the EMR system.

4.3.6 Distribution of Respondents by level of competence

The study sought to establish the level of competence of the healthcare workers in using the EMR system for those who are using the system either fully or hybrid. This was done to determine the skills the healthcare practitioners had in using the EMR system. The distribution results are as shown in table 4.6

Table 4.6 Distribution of the respondents by level of competence

Category	Frequency	Percentage
Basic users	13	18.1
Intermediate users	16	22.2
Advanced users	12	16.7
Total	41	56.9
Not applicable	31	43.1
Total	**72**	**100.0**

On the level of competence 13 (18.1%) reported that they were basic users, 16 (22.2%) were intermediate users in using the EMR system while 12 (16.7%) have advanced skills in using the EMR. This results show that all the healthcare workers under study have skills in using the EMR system.

4.4 Influence of Capacity in the adoption of EMR

4.4.1 Responses of respondents on use of computer applications

The study sought to find out the level of knowledge and operation that the health care practitioners have and therefore the respondents were requested to indicate their competence level in use of some computer applications. The results were as shown in Table 4.7

Table 4.7 Distribution of the respondents on use of computer applications

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	Total	Mean
Competence in using MS Word	0	5.6	4.2	63.9	26.4	72	4.11
Competence in using MS Excel	8.3	20.8	5.6	50.0	15.3	72	3.43
Competence in using MS Access	25.0	30.6	5.6	33.3	5.6	72	2.64

Out of 72 respondents 90.3 % of the respondents have knowledge in using MS Word (mean=4.11), 65.3% reported that they had knowledge in using MS Excel (mean=3.43), while 38.9% reported that they had knowledge in using MS access (mean=2.64). From this analysis it shows that majority of the health care practitioners have basic knowledge in some computer applications but not all of them.

4.4.2 Distribution of respondents by internet usage

The study sought to establish the level of internet usage by the healthcare workers. This was done to determine how often the health care practitioners use the internet. The distribution results are as shown in table 4.8

Table 4.8 Distribution of the respondents by internet usage

Category	Frequency	Percentage
Atleast once a week	53	73.6
Atleast once a month	11	15.3
Rarely use internet	4	5.6
Not using internet at all	4	5.6
Total	**72**	**100.0**

Out of the 72 respondents 53 (73.6%) reported that they use the internet atleast once a week, 11 (15.3%) use the internet atleast once a month, 4 (5.6%) rarely use the internet while 4 (5.6%) never use the internet at all. This results show that majority of the healthcare workers use the internet and therefore could understand and embrace the new technology.

4.4.3 Distribution of Respondents by typing skills

The study sought to establish the level of typing skills of the healthcare workers. This was done to determine how slow or fast the healthcare practitioners were in typing. The distribution results are as shown in table 4.9

Table 4.9 Distribution of the respondents by typing skills

Category	Frequency	Percentage
Slow	28	38.9
Relatively fast	41	56.9
Quite fast	3	4.2
Total	**72**	**100.0**

Out of the 72 respondents 44 (61.1%) reported that they are fast in typing while 28 (38.9%) reported that they were slow in typing. This results show that majority of the healthcare workers under study were relatively fast in typing and therefore could understand and embrace the new technology because as asserted by (Jha et al, 2009), physicians require good typing skills to enter patient medical information, notes and prescriptions into the EMR system, and some physicians lack them.

4.4.4 Distribution of respondents by training and follow-up mentorship provided

The study sought to find out the number of health care practitioners who have received any formal training on the use of EMR system, and further the study sought to find out how many received a follow-up mentorship after the first formal training. The results were as shown in Table 4.10

Table 4.10 Distribution of the respondents by training and follow-up mentorship

	Yes	No	N/A	Total	Mean
Trained on EMR	66.7	33.3	0	72	1.33
Follow-up mentorship after the first formal training	38.9	26.4	34.7	72	1.40

Out of the 72 respondents 48 (66.7%) reported that they had already been trained on EMR system and only 38.9% further received a follow-up mentorship/support on the use of EMR

system. These results show that majority of the healthcare workers received the first formal training, but not all of them had received a follow-up mentorship on use of EMR system. As noted by (Ludwick & Doucette, 2009), physicians struggle to get the necessary and appropriate technical assistance as well as support for the systems from the vendor after the first formal training. Considering that physicians are not technical experts and the systems being inherently complicated, physicians perceive a need for proper technical training and support, which leads to the physicians getting reluctant to use EMR system without it.

Table 4.4.5 Response to gauge level of training, ease of use and follow-up mentorship

The study sought to find out how the health care practitioners gauge the level of training, follow-up mentorship and also the ease of use of the EMR system. The results were as shown in Table 4.11

Table 4.11 Distribution of the response to gauge level of training, ease of use and follow-up mentorship

	Very poor	Poor	Average	Good	Very good	N/A	Total	Mean
Level of training provided	0	0	15.3	41.7	9.7	33.3	72	3.92
Ease of use of EMR system	0	0	27.8	30.6	8.3	33.3	72	3.71
Follow-up mentorship provided	15.3	5.6	19.4	19.4	6.9	33.3	72	2.96

From table 4.11, 51.4 % of the healthcare practitioners responded that the level of training provided was good while 15.3% said it was average. In terms of ease of use 38.9 % of the healthcare practitioners reported that it was good while 27.8% said that it was average. 26.3 % of the healthcare practitioners responded that the follow-up mentorship provided was good, 19.4% responded that it was average while 20.9% said the follow-up mentorship provided was poor. From this analysis it shows that majority of the healthcare practitioners had been trained and the level of training provided was good but only 6.9% received a very good follow-up mentorship and this shows that healthcare providers struggle to get appropriate technical support after the first formal training, and had not developed sufficient experience

to be comfortable in the use the EMR system. This study also found a moderate positive correlation between capacity and adoption of EMR at r = 0.601 p< 0.000 (Table 4.17)

4.5 Influence of Infrastructure in the adoption of EMR

4.5.1 Respondents by availability of a computer

The study sought to find the availability of computers by the respondents. The respondents were requested to state if there was a computer in their department or not. The results are as shown in Table 4.12

Table 4.12 Respondents by availability of a computer

Category	Frequency	Percentage
Yes	45	62.5
No	27	37.5
Total	**72**	**100.0**

Out of the 72 respondents 45 (62.5%) reported that they had a computer available in their department while 27 (37.5%) reported that there was no computer in their department. From this analysis it shows that majority of the healthcare providers have a computer which is one of the minimum requirements given in terms of infrastructure to have an EMR system.

4.5.2 Respondents by full access to computer and printer

The study sought to find the accessibility of infrastructure by the respondents. The respondents were requested to state their accessibility to computers and printers. The results are as shown in Table 4.13

Table 4.13 Distribution by full access to computer and printer

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A	Total	Mean
Full access to a computer everyday	2.8	2.8	0	16.7	40.3	37.5	72	4.42
Full access to a printer when needed	5.6	8.3	4.2	18.1	26.4	37.5	72	3.82

From table 4.13, 57.0 % and 44.5% of the respondents reported that they had full access to a computer and a printer everyday respectively. From this analysis it shows that majority of the healthcare providers have access to a computer and printer and therefore there exists the presence of infrastructure which is one of the minimum specifications given to have an EMR system.

4.5.3 Respondents by availability of other infrastructure

The study sought to find the availability of other infrastructure which is required to have an EMR system. The respondents were requested to state the availability based on the questions asked. The results are as shown in Table 4.14

Table 4.14 Distribution of the respondents by other infrastructure

	Yes	No	N/A	Total	Mean
Computers linked via LAN	30.6	32.0	37.5	72	1.58
Computers have access to internet	25.0	37.5	37.5	72	1.60
Computer room is burglar proofed - windows and doors	62.5	0	37.5	72	1.00
Systems to secure the computers within the rooms	9.7	52.8	37.5	72	1.84
Incidence of theft of EMR equip. in the last 6months	0	62.5	37.5	72	2.00
Back-up system that ensures easier retrieval of patients information/records	30.6	31.9	37.5	72	1.51

From the findings in table 4.14, most of the respondents strongly agreed that; There had not been an incidence of theft of the EMR equipment in the last 6 months (mean=2.00), There were no systems to secure the computers within the rooms e.g. lockable cages, chains etc. (mean=1.84), The computers did not have access to internet (mean=1.60), The computers have not been linked to LAN (mean=1.58), The was no back-up system that ensures easier retrieval of patients information/records (mean=1.51) and finally the computer room is burglar proofed – windows and doors (mean=1.00). From the analysis it clearly shows that interconnectivity problem is a major obstacle to the wide adoption of EMR systems as asserted by (Menachemi, Langley, & Brooks, 2007). This study also found a weak positive correlation between infrastructure and adoption of EMR at $r = 0.205$, $p < 0.177$ (Table 4.17)

4.6 Influence of user perception in the adoption of EMR

The study sought to find the beliefs and perception of health care practitioners concerning adoption of EMR systems. The results are as shown in table 4.15

Table 4.15 Perception of health care practitioner concerning adoption of EMR systems

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	Mean
An EMR system quickens the process of clinical decision-making	0	1.4	13.9	52.8	31.9	72	4.15
An EMR system makes it easier to retrieve patients medical records	1.4	1.4	5.6	45.8	45.8	72	4.33
With an EMR patient waiting time is shortened	1.4	1.4	13.9	45.8	37.5	72	4.17
Implementing an EMR improves confidentiality of patients records	0	0	8.3	47.2	44.4	72	4.36
EMR system can help reduce medication/prescription errors	0	0	8.3	38.9	52.8	72	4.44
With an EMR it is much easier to maintain a patient appointment system	0	1.4	9.7	40.3	48.6	72	4.36
EMR system can improve the patients overall quality of care	0	0	13.9	45.8	40.3	72	4.26
I prefer an EMR system for my day-to-day operations	1.4	0	11.3	38.0	49.3	72	4.34
I feel much in control while using paper-based system than EMR	25.0	20.8	19.4	13.9	20.8	72	2.85
Transitioning to EMR will interfere with my overall performance	36.1	40.3	13.9	2.8	6.9	72	2.04
I am ***not*** assured of the security of the patient information with EMR	45.8	34.7	11.1	2.8	5.6	72	1.88

From the findings in table 4.13, out of the 72 respondents most of them strongly agreed that; An EMR system can help reduce medication/prescription errors (mean=4.44), Implementing an EMR improves confidentiality of patients records (mean=4.36), With an EMR it is much easier to maintain a patient appointment system (mean=4.36), They prefer an EMR system for their day-to-day operations (mean=4.34), An EMR system makes it easier to retrieve

patients medical records (mean=4.33), EMR system can improve the patients overall quality of care (mean=4.26), With an EMR patient waiting time is shortened (mean=4.17), An EMR system quickens the process of clinical decision-making (mean=4.15), They feel much in control while using paper-based system than EMR (mean=2.85), Transitioning to EMR will interfere with their overall performance (mean=2.04) and finally they are not assured of the security of the patient information with EMR (mean=1.88). This study also found a moderate positive correlation between user perception and adoption of EMR at r=0.545, p< 0.000 (Table 4.17)

4.7 Influence of workload in the adoption of EMR

The study sought to find out influence of workload on the adoption of EMR. The respondents were asked to rate the level to which they agree or disagree that the listed workload factors influenced adoption of EMR in the health facilities. The results are as shown in table 4.16

Table 4.16 Influence of workload and the adoption of EMR

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	Mean
In this department, the daily workload is overwhelming	1.4	9.7	8.3	22.2	58.3	72	4.26
The number of staff in this department is adequate enough to offer the services required.	61.1	16.7	12.5	6.9	2.8	72	1.74
In this department, the work schedule (shift) helps to reduce the daily workload.	20.8	15.3	22.2	26.4	15.3	72	3.00
Using the EMR system increases the amount of time spent with each patient.	26.4	31.9	26.4	11.1	4.2	72	2.35
I always work beyond my working hours because of high daily patients turn-up.	8.3	16.7	1.4	27.8	45.8	72	3.86
I find it easy to spare time to learn the EMR system.	8.3	11.1	12.5	43.1	25.0	72	3.65
Adoption of EMR system will increase workload.	4.2	1.4	19.4	33.3	41.7	72	4.07

From the findings in table 4.16, out of the 72 respondents most of them strongly agreed that; the daily workload is overwhelming (mean=4.26), Adoption of EMR system will increase

workload (mean=4.07), they always work beyond their working hours because of high daily patients turn-up (mean=3.86), they find it easy to spare time to learn the EMR system (mean=3.65), the work schedule (shift) helps to reduce the daily workload (mean=3.00), Using the EMR system increases the amount of time spent with each patient (mean=2.35), and finally they disagreed that the number of staff in the department was adequate enough to offer the services required (mean=1.74). This study also found a moderate negative correlation between workload and adoption of EMR at r = -0.653, p< 0.000 (Table 4.17)

Table 4.17: Table showing Correlations Coefficients of variables

Variables		Influence of Capacity	Influence of Infrastructure	Influence of User perception	Influence of Workload	Adoption of EMR
Influence of Capacity	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	72				
Influence of Infrastructure	Pearson Correlation	.229	1			
	Sig. (2-tailed)	.130				
	N	45	45			
Influence of User perception	Pearson Correlation	.469**	.042	1		
	Sig. (2-tailed)	.000	.784			
	N	72	45	72		
Influence of Workload	Pearson Correlation	-.443**	-.441**	-.510**	1	
	Sig. (2-tailed)	.000	.002	.000		
	N	71	45	71	72	
Adoption of EMR	Pearson Correlation	.601**	.205	.545**	-.653**	1
	Sig. (2-tailed)	.000	.177	.000	.000	
	N	72	45	72	71	72

**. Correlation is significant at the 0.01 level (2-tailed).

CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the study findings, conclusions and recommendations. The findings are summarized in line with the objectives of the study which are capacity, infrastructure, user perception and workload. These independent variables were studied against the dependent variable which is adoption of Electronic Medical Records by public health facilities.

5.2 Summary of Findings

The aim of this study was to investigate the factors that influence the adoption of Electronic medical record system in public health facilities in Nakuru County. Four research objectives were formulated to guide the study. Research objective one sought to establish the extent to which Capacity influences the adoption of Electronic Medical Record systems, research objective two sought to examine the extent to which Infrastructure influences the adoption of Electronic Medical Record systems, research objective three sought to assess the extent to which User Perception influences the adoption of Electronic Medical Record systems and research objective four sought to establish the extent to which Workload influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County. The study used descriptive survey research design where self-administered questionnaires were used for data collection The sample for the study was 91 which was the whole population drawn from 13 public health facilities in Nakuru County. Data was analysed using frequency tables, percentages, mean and coefficient correlation. From the data analysed the findings of this study are summarized in the table below.

Table 5.1 Summary of findings

Objective	**Data collection instrument**	**Type of analysis**	**Main findings.**
Capacity and adoption of EMR systems	Questionnaire	Descriptive	The study showed that 90.3 %, 65.3% and 38.9% of the respondents have knowledge in using MS Word, MS Excel and MS access respectively. 73.6% reported that they use the internet atleast once a week, 15.3% use atleast once a month, 5.6% rarely use the internet while 5.6% never use the internet at all. 61.1% reported that they are fast in typing while 38.9% reported being slow in typing. 66.7% reported that they had already been trained on EMR system and out of the healthcare practitioners trained 38.9% further received a follow-up mentorship/support on the use of EMR system. 51.4 % of the healthcare practitioners responded that the level of training provided was good while 15.3% said it was average. In terms of ease of use 38.9 % of the healthcare practitioners reported that it was good while 27.8% said that it was average. 26.3 % of the healthcare practitioners responded that the follow-up mentorship provided was good, 19.4% responded that it was average while

			20.9% said the follow-up mentorship provided was poor.
Infrastructure and adoption of EMR systems	Questionnaire	Descriptive	62.5 % reported that there was a computer in their department, 57.0 % and 44.5% of the respondents reported that they had full access to a computer and a printer everyday respectively. Most of the respondents strongly agreed that; There had not been an incidence of theft of the EMR equipment in the last 6 months (mean=2.00), There were no systems to secure the computers within the rooms e.g. lockable cages, chains etc. (mean=1.84), The computers did not have access to internet (mean=1.60), The computers have not been linked to LAN (mean=1.58), The was no back-up system that ensures easier retrieval of patients information/records (mean=1.51) and finally the computer room is burglar proofed – windows and doors (mean=1.00).
User Perception of health care practitioners and adoption of EMR systems	Questionnaire	Descriptive	Most of the respondents strongly agreed that; An EMR system can help reduce medication/prescription errors (mean=4.44), Implementing an EMR improves confidentiality of patients records (mean=4.36), With an EMR it is much easier to maintain a patient appointment system (mean=4.36), They prefer an EMR system for their day-to-day operations (mean=4.34), An EMR system makes it easier to retrieve patients medical records (mean=4.33), EMR system can

			improve the patients overall quality of care (mean=4.26), With an EMR patient waiting time is shortened (mean=4.17), An EMR system quickens the process of clinical decision-making (mean=4.15), They feel much in control while using paper-based system than EMR (mean=2.85), Transitioning to EMR will interfere with their overall performance (mean=2.04) and finally they are not assured of the security of the patient information with EMR (mean=1.88).
Workload and adoption of EMR systems	Questionnaire	Descriptive	Most of the respondents strongly agreed that; the daily workload is overwhelming (mean=4.26), Adoption of EMR system will increase workload (mean=4.07), they always work beyond their working hours because of high daily patients turn-up (mean=3.86), they find it easy to spare time to learn the EMR system (mean=3.65), the work schedule (shift) helps to reduce the daily workload (mean=3.00), Using the EMR system increases the amount of time spent with each patient (mean=2.35), and finally they disagreed that the number of staff in the department was adequate enough to offer the services required (mean=1.74).

5.3 Discussion of the research findings

5.3.1 Capacity and the adoption of EMR system

One of the objectives of the study was to establish the extent to which Capacity influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County, Kenya. The study findings showed that Capacity was one of the factors influencing the adoption of EMR. Descriptive statistics indicated that as much as most of the respondents agreed that they had basic knowledge in using MS Word (90.3 %) and MS Excel (65.3%), most of the respondents also reported that they had no knowledge in using MS access (38.9%). Most of them further agreed that they use the internet atleast once a week (73.6%) and were also fast in their typing skills (61.1%). With regards to EMR training the respondents strongly agreed that they had already been trained on EMR system (66.7%) and after the training they received a follow-up mentorship/support on the use of EMR system (38.9%). Out of the total respondents who had been trained on EMR most of them strongly agreed that the level of training provided was good (51.4 %) and also were comfortable in using in the system (38.9 %) in terms of ease of use but only a few of the respondents reported that that the level of follow-up mentorship provided was good (26.3 %). This results show that majority of the healthcare workers had the basic knowledge in computer applications and use the internet a lot and therefore could understand and embrace the new technology. These findings were inconsistent with earlier findings from other scholars who indicated that one reason attributing to the low adoption of eHealth among developing countries is lack of computer skills amongst the clinicians as asserted by (Omary *et al,* 2010). For a successful implementation of e-healthcare in the world, computer skills to all healthcare professionals and staff involved in the process is a must. (Omary et al., 2010)

However, these results also show that majority of the healthcare workers under study were relatively fast in typing and therefore could understand and embrace the new technology because as asserted by (Jha et al, 2009) physicians require good typing skills to enter patient medical information, notes and prescriptions into the EMR system, and some physicians lack them. A significant moderate positive correlation was observed between capacity and adoption of EMR at $r = 0.601$, $p < 0.000$. This implies that an increase in capacity would lead to an increase in adoption of EMR. The moderate positive correlation could further be interpreted that capacity had an influence in the adoption of EMR.

5.3.2 Infrastructure and the adoption of EMR system

The research sought to establish the extent to which Infrastructure influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County, Kenya. The study findings showed that Infrastructure was not one of the factors influencing the adoption of EMR. Descriptive statistics indicated that out of the 72 respondents, 45(62.5%) had computers available and 57.0 % and 44.5% of the respondents reported that they had full access to a computer and a printer everyday respectively. The respondents further agreed that there had not been an incidence of theft of the EMR equipment in the last 6 months (mean=2.00), there were no systems to secure the computers within the rooms e.g. lockable cages, chains etc. (mean=1.84), The computers did not have access to internet (mean=1.60), The computers have not been linked to LAN (mean=1.58), The was no back-up system that ensures easier retrieval of patients information/records (mean=1.51) and finally the computer room is burglar proofed – windows and doors (mean=1.00). From this analysis it shows that as much as majority of the healthcare providers have access to a computer and printer which is one of the minimum specifications given to have an EMR system, other 'basic' facilities/hardware required are still missing. These findings were consistent with earlier findings from other scholars who indicated that computer infrastructure is the backbone to e-healthcare services implementation. Sufficient quantity of hardware is required in order to use the EMR systems, which includes phone lines, computers and internet connections. Lack of these 'basic' facilities/hardware blocks the widespread adoption of EMR system as they needed to support EMR implementation (Vishwanath & Scamurra, 2007). This study also clearly shows that interconnectivity and lack of 'basic' facilities/hardware is a major obstacle to the wide adoption of EMR systems as asserted by (Menachemi, Langley, & Brooks, 2007). A significant weak positive correlation was observed between infrastructure and adoption of EMR at $r = 0.205$, $p < 0.177$, implying an increase in infrastructure leads to an increase in adoption of EMR. However the relationship is weak implying lack of infrastructure does not hinder the healthcare practitioners from adopting EMR systems.

5.3.3 User Perception and the adoption of EMR system

The research sought to assess the extent to which User Perception influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County, Kenya. The study findings showed that User Perception was one of the factors influencing the adoption of EMR. In order of their influence from the most influential, descriptive statistics indicated that most of the respondents strongly agreed that; An EMR system can help reduce medication/prescription errors (mean=4.44), Implementing an EMR improves confidentiality of patients records (mean=4.36), With an EMR it is much easier to maintain a patient appointment system (mean=4.36), They prefer an EMR system for their day-to-day operations (mean=4.34), An EMR system makes it easier to retrieve patients medical records (mean=4.33), EMR system can improve the patients overall quality of care (mean=4.26), With an EMR patient waiting time is shortened (mean=4.17), An EMR system quickens the process of clinical decision-making (mean=4.15), They feel much in control while using paper-based system than EMR (mean=2.85), Transitioning to EMR will interfere with their overall performance (mean=2.04) and finally they are not assured of the security of the patient information with EMR (mean=1.88). These findings were inconsistent with earlier findings from other scholars who indicated that more than half (58.1%) of the physicians without an EMR have doubts that EMRs can improve clinical outcomes or patient care according to (Kemper et al., 2006). As asserted by other researchers, those who are not willing to use the EMR system are skeptical about claims that the system will successfully improve the quality of medical practices (Jha et al., 2009), that physicians are concerned about the loss of their control of patient information and working processes by the implementation of EMR systems, since these data will be assessed by others and shared with others. As stated by (Walter & Lopez, 2008) physicians' perceptions are very important in their reaction to EMR adoption of the threat to their professional autonomy, nurses stated that increased time spent interacting with the EMR system decreased their job performance because they spent less time with patients according to (Simon, Kaushal, Cleary, Jenter, Volk, Poon, et al., 2007). This study found a significant moderate positive correlation between user perception and adoption of EMR at $r = 0.545$, $p < 0.000$ implying an increase in user perception by the healthcare practitioners leads to an increase in adoption of EMR systems. The moderate

positive correlation could further be interpreted that user perception had an influence in the adoption of EMR.

5.3.4 Workload and the adoption of EMR system

The research sought to establish the extent to which Workload influences the adoption of Electronic Medical Record systems in public health facilities in Nakuru County, Kenya. The study findings showed that Workload was one of the factors influencing the adoption of EMR systems. In order of their influence from the most influential, descriptive statistics indicated that most of the respondents strongly agreed that; the daily workload is overwhelming (mean=4.26), Adoption of EMR system will increase workload (mean=4.07), they always work beyond their working hours because of high daily patients turn-up (mean=3.86), they find it easy to spare time to learn the EMR system (mean=3.65), the work schedule (shift) helps to reduce the daily workload (mean=3.00), Using the EMR system increases the amount of time spent with each patient (mean=2.35), and finally they disagreed that the number of staff in the department was adequate enough to offer the services required (mean=1.74). These findings were consistent with earlier findings from other scholars who indicated that physicians, other health care professionals and managers lack of time and workload are important barriers to EMR implementation. Studies involving health care professionals made more general statements about heavy workloads (Greenhalgh, Wood, Bratan, Stramer, & Hinder, 2008) and EMR use as being time-consuming (Chronaki et al., 2007; Randeree, 2007) and concerns that EMR implementation would take time away from physicians clinical tasks. Studies about managers expressed concern about EMR use increasing physician workload (Miller & Sim, 2004). This study also found a moderate negative correlation between workload and adoption of EMR at $r = -0.653$, $p < 0.000$. This implies that a decrease in workload would lead to an increase in adoption of EMR. The moderate negative correlation could further be interpreted that workload does influence the adoption of EMR systems.

5.4 Conclusions of the Study

The study examined the extent to which Capacity, Infrastructure, User Perception and Workload influenced the adoption of EMR systems in public facilities in Nakuru County, Kenya. The study was successful in addressing the research objectives and the research questions. Following the study findings presented and discussed above, the study conclusions are as follows:

Capacity was an important contributor to low adoption of EMR system. The results indicated a significant relationship between capacity and adoption of EMR and this meant that adoption of EMR was affected by Capacity.

Further, the findings indicated a weak positive insignificant relationship between infrastructure and adoption of EMR and this implied that adoption of EMR was not in any way affected by lack of Infrastructure.

Also, the findings indicated a moderate positive significant relationship between user perception and adoption of EMR and this meant that adoption of EMR was affected by user perception.

Finally, workload related factors were found to influence and correlated to the adoption of EMR. Most healthcare workers reported that the daily workload was overwhelming (80.5%) and adoption of EMR will increase workload (73.6). The findings indicated a significant positive relationship thus attributing to the low adoption of EMR as asserted by other scholars in other studies where they said that involving health care professionals made more general statements about heavy workloads (Greenhalgh, Wood, Bratan, Stramer, & Hinder, 2008) and EMR use as being time-consuming (Chronaki et al., 2007; Randeree, 2007) and concerns that EMR implementation would take time away from physicians clinical tasks.

5.5 Recommendations

1. Including ICT in the curriculum of medical courses as this will give them ownership and confidence to use the technology once they join the practicing field and this will assist in the adoption of EMR by the physicians.
2. After the first formal training of the healthcare practitioners a very good follow-up mentorship should follow to provide the necessary technical support and this will help the healthcare providers to get sufficient experience to be comfortable in the use the EMR system.
3. The ministries of health to consider having sufficient health care providers to meet the need of the ever increasing number of patients visiting the health facilities on a daily basis through training more medical personnel and providing adequate incentives to them to enable their working in the facilities. This will assist in reducing the daily workload.

5.6 Areas for further Study

This study focused on four factors that were considered to influence the adoption of EMR, this research recommends that future research should look into more factors that may influence adoption of EMR.

This study was done in Nakuru County only, therefore this research recommends a research be done on a wider area to allow for more generalizability.

This study focused on the public facilities only, therefore this research recommends that the same study be done for private facilities to gauge their level of adoption of EMR.

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Appendix 1: Letter of Transmittal

Gladys C. Chebole
University of Nairobi
Department of Extra-Mural Studies
Tel: 0722591112
Email: gladyschebole@gmail.com
15/05/2015

To my
Respondent,
Dear Sir/Madam,

RE: REQUEST FOR YOUR PARTICIPATION

I am a postgraduate student at the University of Nairobi, carrying out a research study on the factors influencing adoption of Electronic medical records in public facilities in Nakuru County, Kenya.

You have been selected as one of the respondents to assist in providing the requisite data and information for this undertaking. I kindly request you to spare a few minutes and answer the attached questionnaire. The information so obtained will be used for academic purposes only, will be treated with utmost confidentiality and will not be shared with anyone whatsoever. Do not write your name anywhere on the questionnaire.

Thank you for your cooperation.

Yours faithfully,
Chebole Gladys

Appendix 2: Research Permit

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No.

Date:

9th July, 2015

NACOSTI/P/15/9387/6727

Gladys Chepngetich Chebole
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Factors influencing adoption of electronic medical records systems in public health facilities in Kenya: A case of Nakuru County,"*** I am pleased to inform you that you have been authorized to undertake research in **Nakuru County** for a period ending **31st December, 2015.**

You are advised to report to **the County Commissioner and the County Director of Education, Nakuru County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. S. K. LANGAT, OGW
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nakuru County.

The County Director of Education
Nakuru County.

Appendix 3: QUESTIONNAIRE FOR HEALTH CARE PRACTITIONER

My name is Gladys Chebole. I am a student at the University of Nairobi, carrying out a study on the factors influencing adoption of Electronic Medical Records in public facilities as a course requirement. I kindly request you to spare a few minutes and answer the attached questionnaire. The information provided will be used for academic purposes only and will be treated with utmost confidentiality. Please do not write your name anywhere on the questionnaire. I would appreciate your voluntary participation in completing the questionnaire.
Thank you.

(Please read the instructions carefully before every question and provide your response appropriately.)

SECTION ONE: GENERAL INFORMATION
(Please tick (√) the appropriate answer.)

1. Your Gender? Male ( ) Female ( )

2. Your Age group?

Under 29 years	[ ]	30-39 years	[ ]
40-49 years	[ ]	50 years or over	[ ]

3. What is your highest level of education?

Certificate	[ ]	Diploma	[ ]
Graduate	[ ]	Post Graduate	[ ]

4. In which department do you work? **(Select one)**

a) CCC	[ ]
b) Lab	[ ]
c) Pharmacy	[ ]
d) OPD	[ ]
f) MCH	[ ]

5. For how long have you been working in this facility?

a) Less than 1 year [ ]

b) 1 - 5 years [ ]

c) 6 – 10 years [ ]

d) More than 10 years [ ]

6. Choose what best describes the level of electronic medical record system in your department? (Tick only one box)

a) [ ] Management of health records in this department is fully electronic.

b) [ ] Management of health records in this department is hybrid (partially electronic and partially paper-based.

c) [ ] We do not have electronic medical records in this department.

If your answer is C in the above question, skip to section six, otherwise answer question 7 to section five.

7. Please estimate your level of competence in using the EMR system in your department.

a) [ ] I am a basic user (Basic competence)

b) [ ] I am an intermediate user

c) [ ] I am an advanced user

d) [ ] I have no skills/competence

SECTION TWO: Influence of Capacity and the adoption of EMR Systems.

Please estimate your level of knowledge and operation of the following computer applications. Please tick (√) the appropriate answer.

Use the scale of: 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, 5 = strongly agree

		1	**2**	**3**	**4**	**5**
C8.	I am competent in using MS Word					
C9.	I am competent in using MS Excel					
C10.	I am competent in using MS Access					

C11. Please choose one response that best describes your internet usage

a) [ ] I use internet services atleast once every week

b) [ ] I use internet services atleast once a month

c) [ ] I rarely use internet (a month can go without using internet services)

d) [ ] I do not use internet services at all

C12. Please choose one response that best describes your typing skills

a) [ ] I am slow in typing

b) [ ] I am relatively fast in typing

c) [ ] I consider myself quite fast in typing

C13. Have you received any form of training course on Electronic Medical Records software?

Yes [1] ☐

No [2] ☐

If your answer is NO in the above question, skip to section three, otherwise answer question C14 below.

C14. Have you received any further follow-up mentorship after the first formal training?

Yes [1] ☐

No [2] ☐

Please gauge the implementation of Electronic Medical Record system in your department. Please tick (√) the appropriate answer.

Use the scale of: 1 = very poor, 2 = poor, 3 = average, 4 = good, and 5 = very good

		1	**2**	**3**	**4**	**5**
C15.	Level of training provided					
C16.	Ease of use of the EMR system					
C17.	Follow-up mentorship provided					

SECTION THREE: Influence of Infrastructure and the adoption of EMR Systems.

In18. Is there a computer(s) in your department?

Yes [1] ☐

No [2] ☐

Please point out the extent to which you agree with each of the following statements. Please tick (√) the appropriate answer.

Use the scale of: 5= strongly disagree, 4= disagree, 3= neutral 2= agree and 1= strongly agree

		1	**2**	**3**	**4**	**5**
In19.	I have full access to a computer every day					
In20.	I have full access to a printer whenever I need					

In21. Are computers in this department linked via local area networks?

Yes [1] ☐

No [2] ☐

In22. Computers in this department have access to internet.

Yes [1] ☐

No [2] ☐

In23. Is the computer room burglar proofed – windows and doors?

Yes [1] ☐

No [2] ☐

In24. Are there systems to secure the computers within the room(s) e.g. lockable cages, chains etc.

Yes [1] ☐

No [2] ☐

In25. Has there been an incidence of theft of EMR equipment in the last 6 months?

Yes [1] ☐

No [2] ☐

In26. There is a records back-up system that ensures easier retrieval of patient records/information.

Yes [1] ☐

No [2] ☐

SECTION FOUR: Influence of User Perception and the Adoption of EMR Systems.

In your views, please rate the extent to which you agree with the following statements. Please tick (√) the appropriate answer.

Use the scale of: 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, 5 = strongly agree

		1	**2**	**3**	**4**	**5**
P27.	An EMR system quickens the process of clinical decision-making					
P28.	An EMR system makes it easier to retrieve patients past medical records					
P29.	With an EMR system the patient waiting time is shortened					
P30.	Implementing an EMR system improves confidentiality of patients records					
P31.	EMR system can help reduce medication/prescription errors					
P32.	It is much easier to maintain a patient appointment system records using EMR than paper-based system					
P33.	EMR system can improve the overall quality of care offered to patients.					

P34.	I prefer an EMR system for my day-to-day operations than using paper-based record systems					
P35.	I feel much in control while using paper-based patient records than using EMR					
P36.	Transitioning from paper-based system to EMR will interfere with my overall performance.					
P37.	I am ***NOT*** assured of the security of the patient information in the EMR system.					

SECTION FIVE: Influence of Workload and the Adoption of EMR Systems.

Rate the following in terms of workload towards EMR adoption. Please tick (√) the appropriate answer.

Use the scale of: 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, 5 = strongly agree

		1	**2**	**3**	**4**	**5**
W38.	In this department, the daily workload is overwhelming					
W39.	The number of staff in this department is adequate enough to offer the services required.					
W40.	In this department, the work schedule (shift) helps to reduce the daily workload?					
W41.	Using the EMR system increases the amount of time spent with each patient.					
W42.	I always work beyond my working hours because of high daily patients turn-up.					
W43.	I find it easy to spare time to learn the EMR system.					
W44.	Adoption of EMR system will increase workload.					

SECTION SIX

(This section applies only if your response to question 6 was 'C')

PART ONE: Influence of Capacity and the adoption of EMR Systems.

Please estimate your level of knowledge and operation of the following computer applications. Please tick (√) the appropriate answer.

Use the scale of: 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, 5 = strongly agree

		1	**2**	**3**	**4**	**5**
C8.	I am competent in using MS Word					
C9.	I am competent in using MS Excel					
C10.	I am competent in using MS Access					

C11. Please choose one response that best describes your internet usage

a) [ ] I use internet services atleast once every week

b) [ ] I use internet services atleast once a month

c) [ ] I rarely use internet (a month can go without using internet services)

d) [ ] I do not use internet services at all

C12. Please choose one response that best describes your typing skills

a) [ ] I am slow in typing

b) [ ] I am relatively fast in typing

c) [ ] I consider myself quite fast in typing

C13. Have you received any form of training course on Electronic Medical Records software?

Yes [1] ☐

No [2] ☐

If your answer is NO in the above question, skip to PART TWO, otherwise answer question C14 below.

C14. Have you received any further follow-up mentorship after the first formal training?

Yes [1] ☐

No [2] ☐

Please gauge the implementation of Electronic Medical Record system in your department. Please tick (√) the appropriate answer.

Use the scale of: 1 = very poor, 2 = poor, 3 = average, 4 = good, and 5 = very good

		1	**2**	**3**	**4**	**5**
C15.	Level of training provided					
C16.	Ease of use of the EMR system					
C17.	Follow-up mentorship provided					

PART TWO: Influence of Infrastructure and the adoption of EMR Systems.

In18. Is there a computer(s) in your department?

Yes [1] ☐

No [2] ☐

If your answer is No in the above question, skip to PART THREE, otherwise answer question In18 below.

Please point out the extent to which you agree with each of the following statements. Please tick (√) the appropriate answer.

Use the scale of: 5= strongly disagree, 4= disagree, 3= neutral 2= agree and 1= strongly agree

		1	**2**	**3**	**4**	**5**
In19.	I have full access to a computer every day					
In20.	I have full access to a printer whenever I need					

In21. Are computers in this department linked via local area networks?

Yes [1] ☐

No [2] ☐

In22. Computers in this department have access to internet.

Yes [1] ☐

No [2] ☐

In23. Is the computer room burglar proofed – windows and doors?

Yes [1] ☐

No [2] ☐

In24. Are there systems to secure the computers within the room(s) e.g. lockable cages, chains etc.

Yes [1] ☐

No [2] ☐

In25. Has there been an incidence of theft of EMR equipment in the last 6 months?

Yes [1] ☐

No [2] ☐

In26. There is a records back-up system that ensures easier retrieval of patient records/information.

Yes [1] ☐

No [2] ☐

PART THREE: Influence of User Perception and the Adoption of EMR Systems.

In your views, please rate the extent to which you agree with the following statements. Please tick (√) the appropriate answer.

Use the scale of: 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, 5 = strongly agree

		1	2	3	4	5
P27.	An EMR system quickens the process of clinical decision-making					
P28.	An EMR system makes it easier to retrieve patients past medical records					
P29.	With an EMR system the patient waiting time is shortened					
P30.	Implementing an EMR system improves confidentiality of patients records					
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P35.	I feel much in control while using paper-based patient records than using EMR					
P36.	Transitioning from paper-based system to EMR will interfere with my overall performance.					
P37.	I am ***NOT*** assured of the security of the patient information in the EMR system.					

PART FOUR: Influence of Workload and the Adoption of EMR Systems.

Rate the following in terms of workload towards EMR adoption. Please tick (√) the appropriate answer.

Use the scale of: 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, 5 = strongly agree

		1	2	3	4	5
W38.	In this department, the daily workload overwhelming					
W39.	The number of staff in this department is adequate enough to offer the services required.					
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W44.	Adoption of EMR system will increase workload.					