

**FACTORS INFLUENCING ADOPTION OF COMPUTERIZED  
HEALTH RECORD SYSTEMS IN KISII COUNTY**

**BY:**

**BRIAN OYUGI ONDARI RAMBEKA**

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## **DECLARATION**

This research project is my original work and it has not been presented for an award of any degree in any other university

**Signature:** ..... **Date:** .....

**Brian Oyugi Ondari Rambeka**

**L50/70267/2013**

This research project report has been submitted for examination with my approval as the University Supervisor.

**Signature:** ..... **Date:** .....

**Mr. Onuonga G. Odhiambo**

**Lecturer , University of Nairobi**

## **DEDICATION**

I dedicate this research project; to my loving parents Mr. Joseph Rambeka and Mrs. Mary Rambeka for the effort they put in terms of funding my Master's Degree programme, without them this work would not have been possible.

To my nephew Mr. Ryan Ogega it is your words that offered the inspiration to further my Education and made me work hard to achieve what you saw in me.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

<b>AMPATH</b>	: Academic Model for Prevention and Treatment of HIV/AIDS
<b>AMRS</b>	: Medical Record System
<b>CHR</b>	: Computerised Health Record
<b>EMR</b>	: Electronic Medical Record
<b>HER</b>	: Health Electronic Record
<b>HIS</b>	: Health Information Systems
<b>HIV</b>	: Human Immunodeficiency Syndrome
<b>ICT</b>	: Information Communication Technology
<b>MMRS</b>	: Mosoriot Medical Record System
<b>MOH</b>	: Ministry of Health
<b>NGO's</b>	: Non-Governmental Organizations
<b>TB</b>	: Tuberculosis
<b>USA</b>	: United States of America
<b>UTAUT</b>	: Unified Theory of Acceptance and Use of Technology.
<b>WHO:</b>	: World Health Organization.

## ABSTRACT

Despite the benefits of adopting computerized health records systems, most healthcare facilities in Kisii County are still registering patients using pen and paper. Therefore, the study sought to investigate the factors influencing the adoption of computerized health record systems in Kisii County. The study was guided by the objectives; To establish how security and privacy issues influence the adoption of computerized health record systems in Kisii County, To determine how availability of ICT infrastructure influences the adoption of computerized health record systems in Kisii County, To assess how funding influences adoption of computerized health record systems in Kisii County and to examine the extent to which training influences the adoption of computerized health record systems in Kisii County and how these variables influence adoption of computerized health records systems in Kisii County. The research operated on the following assumptions; the sample selected was representative of the total population of health professionals in Kisii County, the research instrument was valid and reliable in measuring the expected outcome and that the respondents were co-operative by giving information honestly and objectively to help in answering the research questions. Literature was reviewed on the platform of the study key variables and the study was grounded on the Unified Theory of Acceptance and Use of Technology. The study adopted a descriptive survey research design targeting a population of 336 potential subjects from there a sample size of 100 respondents was drawn. Sample selection was done using stratified random sampling techniques. Data was collected using a questionnaire which was pretested with 33 pre-test sample respondents. Validity was ascertained through adequate coverage of research objectives, peer review and expert judgement. Data was analyzed using descriptive statistics such as frequencies and percentages. From the study findings i was able to conclude that, despite the benefits of using CHR in healthcare practices, the adoption rate of such systems in Kisii County is still low and they meet resistance from healthcare providers. I recommended that, medical training institutions should adapt to the use of CHRs in training their students to accelerate the CHR adoption. This was to give them confidence to use the technology once they join the practicing field and the Ministry of Public Health was to come up with standardization of the development of the CHR systems so that they can easily be integrated with each other and friendly to use.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the study

Quality health care at affordable cost has been the focus of governments in many countries. The use of appropriate information and communication technologies is being given priority in many health care initiatives; one such initiative is the Computerized Health Record (CHR) systems. CHR systems are computer based systems used for recording patients' medical history and managing health care (Wang et al. 2003).

In the UK adoption of computerized health record system is quite impressive according to Health Canada (2001), it is handled by their National Health Services which is primarily funded through taxes. Their healthcare facilities receive promotions of free computers, inexpensive software with 90 percent or more healthcare providers using the CHR to record clinical findings and transmit laboratory results (Jha, Doolan, Grandt, Scott and Bates, 2008).

The adoption of computerized health records systems in Denmark is also impressive. According to OECD (2013), Denmark's broadband connectivity stood at 83.9 percent with medical patient data stored in digital form in more than 99 percent of practices and transmission is well established and widespread. The healthcare is a publically funded system primarily funded through taxes (Protti, Edworthy, and Johansen, 2007).

In the United States adoption of computerized health records systems has been lagging behind among the OECD countries. A study on computerized health records adoption and usage cited that despite the presence of the CHR systems, doctors, and other caregivers have been slow to adopt them (wager, 2008). This was attributed to the design of the system. According to Menachemi (2006), healthcare providers were not familiar with computers in

general this deterred them from using computerized health records systems resulting in productivity loss. In 2009, as part of the American recovery and reinvestment act the government passed into law the health information technology for economic and clinical health (HITECH) act 2009 offering economic incentives for the health care providers using information technology in a useful way accelerating the pace for CHR adoption and usage.

According to Taylor (2013), adoption of computerized health records systems in Australia has been low in comparison to what the government was expecting. Traditionally, the health facilities were encouraged to install clinical software packages for electronic data exchange. These systems provided patients' medical history, security mechanisms to enforce confidentiality and also offering decision support systems (DSS) support by providing real-time information to help in decision and policy making.

Developing countries are now waking up to the realization that they have to embrace information and communication technologies to deal with the problem of access, quality and costs of healthcare (Ojo et al, 2007). The South African health sector faces many challenges in the adoption of computerized health records system adoption (Olugbara et al. 2006; Uys 2006). According to IT-Online (2007), lack of standardisation and integration between health information systems are major barriers to the full realisation of the benefits of e-health solutions. Although there are many ICT solutions available they are neither well-known nor much used an explanation for this anomaly is the limited availability of suitable technologies. Herselman and Jacobs (2003) opines that the development of the local economy in rural South Africa is severely compromised by lack of infrastructure, services and expertise. Against this result, there is a tension that surrounds the decision to introduce a compulsory National Health Insurance Fund for all South Africans (Kahn, 2011). South Africa's National health department made a strategic decision to initialize a national EHR system in 2002 starting with their public health sector.

In 2009, e-Health Nigeria implemented a computerized health records system for family health unit for the shehu Idris College still the rates of adoption of computerized health records in Nigerian are poor. Faced with Internet connectivity problems health care service delivery in Nigeria falls short of international standards resulting from poor state of health care infrastructure, shortage of medical professionals (Arikpo, Etor, and Usang, 2007). According to Okogbule (2007), health care system has continued to suffer from years of neglect hence the poor infrastructural base of both public and private health establishments.

In Tanzania adoption of computerized health records systems is very low. According to the International Telecommunication Union, by the year 2006, the Internet penetration in Tanzania was 1 percent of the population (ITU, 2007). The low rate of Internet penetration and low bandwidth are among the challenges to e-healthcare adoption in Tanzania. In a study by Sood et al. (2004) which examined challenges that healthcare workforce face while implementing telemedicine in Tanzania, technology and computer literacy was considered to be the main challenge. Their health sector is poorly funded making it difficult to allocate much money for acquisition of ICT resources needed in the health sector (Mkulo, 2008).

Adoption of computerized health records system in Kenya has increased with the years, although the patterns are still inconsistent and the adoption rate has been slow in comparison to what the ministry of health anticipated (WHO, 2011). According to the world health organization (2011), CHR was first introduced to Kenya in 2001, the Moi Teaching and Referral Hospital in Eldoret, Kenya, established the Academic Model for Prevention and Treatment of HIV/AIDS (AMPATH); later followed by the Mosoriot Medical Record System (MMRS) implemented at a primary care rural health centre in 2005, provides patient registration and patient visit records management with capability to handle information of over 60,000 patients (Sood et al., 2008).

Kisii County is one of the Counties making an effort to adopt computerized health record systems in its health facilities with some healthcare establishments integrating the system into their practise, most of the out and in-patients are expected to register online before they are admitted to the hospitals for any medication. Despite the benefits of computerized health records according to the ministry of health, Kisii County records 2013, indicate that most healthcare facilities in Kisii County are still registering patients using pen and paper. Therefore, this study seeks to investigate the factors influencing the adoption of computerized health record systems in Kisii County it can also guide policy and practice.

## **1.2 Statement of the problem**

Kisii County is one of the Counties making an effort to adopt computerized health record systems in its health facilities with some healthcare establishments integrating the system into their practise, most of the out and in-patients are expected to register online before they are admitted to the hospitals for any medication. Despite the benefits of computerized health records according to the ministry of health, Kisii County records 2013, indicate that most healthcare facilities in Kisii County are still registering patients using pen and paper. Therefore, this study seeks to investigate the factors influencing the adoption of computerized health record systems in Kisii County it can also guide policy and practice.

## **1.3 Purpose of the study**

The purpose of the study will be investigating the factors influencing the adoption of computerized health record systems in Kisii County.

## **1.4 Objectives of the study**

This study will be guided by the following objectives:

1. To establish how security and privacy issues influence the adoption of computerized health record systems in Kisii County.



2. To determine how availability of ICT infrastructure influences the adoption of computerized health record systems in Kisii County.
3. To assess how funding influences adoption of computerized health record systems in Kisii County.
4. To examine the extent to which training influences the adoption of computerized health record systems in Kisii County.

### **1.5 Research Questions**

The study seeks to answer the following questions:

1. How does security and privacy issues influence the adoption of computerized health record systems in Kisii County?
2. How does the availability of ICT infrastructure influence the adoption of computerized health record systems in Kisii County?
3. How does funding influence the adoption of computerized health record systems in Kisii County?
4. To what extent will training influence the adoption of computerized health record systems in Kisii County?

### **1.6 Significance of the study**

It will be my hope that the study findings would be beneficial to health facilities. The health facilities will likely use the recommendations of the study to improve their operations making them more relevant. It will be my hope that the research findings will be beneficial to the government of Kenya. This will be by formulating policies which will be relevant to the health care. Lastly, the study will also assist interested parties like non-governmental

organizations (NGO's) and other donors of the health care to assess the possibilities of assisting the health facilities to be successful and beneficial.

### **1.7 Limitations of the study**

The study may be affected by changing weather patterns especially during data collection process, I will therefore acquire an umbrella and gum boots for ease of movement. Also the researcher will be under the constraints of time so proper time management will be of the essence to be able to finish the study on time. Also, there will be limitations in terms of resources. The study involves a lot of movement which will be very costly. To solve this; the investigator will source for funds from relatives and his personal savings. Lastly, there will be a dearth of literature to permit a considerable base for detailed analysis of the subject.

### **1.8 Delimitations of the study**

The scope of my study will be Kisii County; I chose to do a study in Kisii County because of the following factors: First, no other study has been carried out in the County to examine the factors influencing the adoption of computerized health record systems. Secondly, the area of the study will be an urban setup hence generalization would be limited to urban setting only. In terms of coverage, Kisii County just like any other County in Kenya experiences challenges which might be similar to other Counties and hence a good area of study. Thirdly, the respondents of the study being health professionals from Kisii County, they almost equally experience similar challenges which will be likely to make them free to give honest and reliable answers to the questions, I am also familiar with the local dialect and can use it where need be. Similarly, accessibility of the area under study will make the study successful given that the investigator can use a motorcycle to reach the respondents. Lastly, I will be delimited to using a questionnaire as my data collection instrument because; it will cover a broad range of content areas within a brief period of time, easy to administer,

cheaper, less time consuming, and allowing the researcher to get first-hand information from the correspondents making it easier for the investigator to complete the study on time.

### **1.9 Basic assumptions of the study**

The research will operate on the following assumptions; first, the sample selected will be representative of the total population of health professionals in Kisii County. There will also be the assumption that the research instruments will be valid and reliable in measuring the expected outcome. Lastly, it will be assumed that the respondents will be co-operative by giving information honestly and objectively to help in answering the research questions.

### **1.10 Definition of significant terms as used in the study**

**Computerized health records Systems:** Are electronic patient-level clinical information derived from multiple sources, into one point of access,” and “replaces the paper medical record as the primary source of patient information.

**Adoption:** Is the acceptance and integration of a new technology or changes within an organization.

**Training:** Is the process of teaching a person a particular type of skill.

**Funding:** Is any activity that is undertaken to fulfil economic goals.

**Privacy:** Are the right and desire of an individual to control the collection, use and disclosure of his or her health.

**Security:** Are methods such as policies, procedures or safeguards by which access to patient health information is controlled and protected from accidental or intentional disclosure to unauthorised persons, and from alteration, destruction and loss.

**ICT Infrastructure:** The infrastructure includes the supporting hardware, software, and management system required to run a particular application ( in this case of CHR ) this

includes the data networks ( routers, wires, switches, hubs) workstations ( PCs, laptops, hand-held devices) servers ( database, applications, print/files) and telecommunications equipment and services.

### **1.11 Organization of the study**

Chapter one provided: the background of the study, statement of the problem, the purpose of the study and objectives of the study. It also contained significance of the study, limitations of the study, delimitations of the study, scope of the study, basic assumption of the study, definition of significant terms as used in the study and lastly the organization of the study.

Chapter two is a literature review focused on factors influencing adoption of computerized health records systems in Kisii County. It also discussed the introduction, concept of computerized health record systems adoption. The chapter also contained the theory of study, conceptual framework and lastly, a summary of the literature review.

Chapter three contained the research methodology which gave in details the introduction, research design, target population, sample size, sample selection, research instrument, instrument validity, instrument reliability, data collection procedures. It also had the data analysis techniques, operationalization table and ethical consideration.

Chapter four gave details of data analysis, presentation, interpretation and discussion. It also gave an introduction to the findings. Chapter five gave a summary of the findings, discussions, conclusions, recommendations and suggestions for further research.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter reviewed literature which is related to the study based on the following thematic areas: The concept of the CHR systems, security and privacy issues, the financing aspect, training, and availability of ICT infrastructure and their influence on the adoption of CHR systems. It also highlights different important issues relating to these factors as well. The conclusion of the discussion is given at the end of the chapter.

#### **2.2 The concept of adoption of CHR systems**

Computerised health record systems have the potential to reduce paper work in hospital environment which results in reducing medical errors, minimizing the repetition of medical tests which affects in lowering health care cost. Evidence-based practices play a key role in efficient health information system quality, outcome and efficiency of health. Application of ICT facilitates the delivery of appropriate health services to the populace (Mechael, 2005).Implementation of computerized health records (CHRs) and HIT systems is considered among the highest priorities of modern healthcare systems. There are some barriers that have been identified that could have affected the implementation, adoption rates and usage of these systems. Computerised Health Records date back to the mid 1960's when a clinical data management system was unveiled by Lockheed at the El Camino Hospital in Mountain View California. In the 1980's, a health information system was legally declared available for unrestricted use by both the public and private sector in the USA. The CHR system has continuously evolved over the years and has been implemented in most large hospitals (Giles et al, 2013).

Benefits of CHR over traditional paper-based storage and access of patient records are many, and it depends on the extent of functionalities in a CHR. At the micro-level, health care providers benefit from fast access to medical records, cost and space savings from digital storage, better readability (no handwritten prescriptions) leading to reduction of errors in medicine dispensing, analytics for medication results and analytical support for diagnosis. Patients benefit from better health care and support. At the macro-level, statistics can be quickly compiled and aggregated at regional and national levels to support macro-level health care policies. Other stakeholders such as insurance providers benefit from documented evidence of illness, medication and hospitalisation, thus leading to quick settlement of insurance payments and avoidance of fraudulent insurance claims. Evidence in prior research substantiates these views. For example, a study of EMR effects in primary health care clinics found that CHR improves the quality of patient care, decreases medical errors, and generates positive financial return on investment to the health care organization (Wang et al., 2003).

The investment in the development of effective health information systems would have multiple benefits and would enable; Early detection and control of emerging and endemic health problems; monitoring and evaluating the progress towards health goals; promote equity in distribution of health resources; Empowering of individuals and communities by providing them with timely and understandable health related information; With data available in real time, the evidence –based would be strengthened and help decision makers in effective health policies formulation and monitor MDGs; enable innovation through research; Improve governance in the health industry; mobilize new resources and ensure accountability in their use; Strengthening national and health information systems will also require a collaborative effort (WHO, 2011).

There are different health care professionals depending on the areas they are located, their availability of resources and facilities, and the capacity that they can hold. In comparison between the number of large hospitals and the small clinics, there are evidently a significantly large number of small clinics that serve the people living in rural areas, densely populated areas and the suburbs. In a bid to improve efficiency, most of the large hospitals and institutions are trying to adopt the implementation and usage of computerized health records a significant percentage of these facilities do not have any proper data documentation of their patients in order to follow a proper system of providing health care. According to the ministry of medical services (2010) information on these patients is lost or hard to find if it is all on paperwork making efficiency negligible.

### **2.3 Influence of security and privacy issues on adoption of CHR Systems**

Despite the presence of other challenges that countries may face in its adoption to e-healthcare; privacy and security are the two most important challenges involved in protecting patient healthcare information from accidental or intentional misuse (Maheu et al., 2001). System stability, in the context of the security and privacy credentials given to the authorised users, computerised health record systems deal with sensitive medical information on patients which should be treated with confidentiality. In the USA, security and privacy is enforced by use of passwords dependent on sub-routines that check against a hash-code of the password. They have enacted strict privacy laws regarding patient information to improve the security of CHRs (U.S. Department of Health and Human Services, 2012; Pascale Carayon, 2009). One of the important tools for data security is by using audit trails as some of the security breaches might have resulted from misuse of access privileges by authorized persons (Barrows, 1996).

In Indonesia, as most of CHR implementations elsewhere, this is done by hospital incentives, and many of them are relying on the password protection for the security. Many hospitals in Indonesia believe that password user protection is sufficient enough to have secured CHRs (Horst, 2001). However, with the lack of clear security standards ethical issues are likely to arise. The confidentiality of the patient healthcare information may be broken either internally, by accidental disclosure, insider curiosity or by insider subordination or may be broken from outside intrusion through unauthorised access. It is of utmost importance to keep such information safe because if otherwise revealed to unauthorised party then it could create legal issues (Kelly and Unsal, 2002).

The privacy concern is a main reason for many Australians not to participate in the system. They have no confidence in the system in terms of privacy and security. Even though privacy risks in design and operation are identified and recommendations are provided in the Privacy Impact Assessment Report. They are not sure how their sensitive medical information will be protected (Taylor, 2013). Health care professionals have doubts whether CHRs are secure for patients' information and records and fear that data in the system may be accessible to those who are non-authorized parties. Inappropriate disclosure of patient information leads to legal problems. According to Simon et al (2007) health care professionals are more concerned about legal issues than the patients themselves since they are more aware of their professional work ethics.

In Tanzania, the ministry of health was proposing the use of birth certificate numbers as an alternative solution to uniquely identify individuals; the patient unique identifier (PUI) when adopting e-healthcare and CHR as a means of enforcing security and privacy standards and reliability at all times (WHO, 2006). Reliability of the systems is the probability that a device performs its intended function within the set parameters. A system dealing with patient information must offer reliability in order to give the health care professionals some



confidence that the system will always be available when needed. Technically, a major concern would be accessibility to patient records securely if there are some technical hitches with the systems hardware and software and other unethical IT concerns (Bowman, 2013).

#### **2.4 Influence of availability of ICT infrastructure on adoption of CHR Systems**

First world countries have mature and advanced healthcare infrastructures their governments are committing massive amounts of resources to promote research and development. ICT Infrastructure offers a range of technologies and services essential to the efficient service delivery of an organization. According to OECD (2013) developed Countries such as Denmark, broadband connection per household stands at 83.9%. Availability of these infrastructures would determine the pattern of adoption and usage of technology. For a basic CHR system to work, they are some minimum specifications of hardware that are needed like computers, printer, phone lines and network connectivity (Little Johns Wyatt and Garvican 2003). System developers also give the minimum required computer specification for the system to run efficiently; the higher the specifications, the harder to find the hardware and the higher the costs also if the system is to be accessed over the internet, there has to be an existing infrastructure that can aid in its access (Miller, 2005).

According to a study conducted by Micevska Maja (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 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.

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 lack of

proper ICT infrastructure and internet penetration in developing countries, the majority of them cannot support internet deployment, which in turn, hampers eHealth adoption. Even in developing countries that have high internet penetration, bandwidth may still be a challenge, 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 OECD (2013). According to IT-Online (2007), lack of standardisation and integration between health information systems are major barriers to the full realisation of the benefits of e-health solutions. The Internet penetration in Tanzania was 1 percent of the population (ITU, 2007). The low rate of Internet penetration and low bandwidth are among the challenges to e-healthcare adoption in Tanzania.

Knowledgeable vendors develop quality CHR systems and guide their clients through the adoption and usage process to ensure that their systems remain relevant to the user a crucial aspect for the acceptance of CHR systems. The main concern could be that these vendors can become a one chance show, do not give the appropriate support and training, and disappear when the risks and maintenance costs get too high leaving the health care professionals with an obsolete system (Torda, 2010). However, to fully realize the importance of availability of ICT infrastructure 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).

## **2.5 Influence of funding on adoption of CHR Systems**

This is related to monetary issues that are involved in the implementation of the CHR systems. The overall cost of implementation is often cited as a barrier to their use. Funding of the health sector determines adoption of computerized healthcare (Omary et al., 2010;

Abdullah, 2012). According to Reinartz 2004, First world countries are able to make significant investments in research to develop information systems that would meet the need of their particular healthcare system. Findings show that increased funding in health sector is strongly correlated with adoption of eHealth even in the case of developed countries and this should also be the case for developing countries for example, the UK government made a mistake of not considering this and invested hugely into the project that ultimately failed and did not have any return on investment (Yu, 2012).

Due to low funding of health sector by the government in third world countries, Omary et al (2010) argues that it is difficult to allocate much money for acquisition of ICT resources needed in the health sector. Adoption of computerized health infrastructure is costly and this calls for increased funding in the health sectors for various developing countries. In Nigeria, Their health sector is poorly funded making it difficult to allocate much money for acquisition of ICT resources needed in the health sector (Mkulo, 2008). According to Okogbule (2007), health care system in Tanzania has continued to suffer from years of neglect hence the poor infrastructural base of both public and private health establishments.

The major concern being whether they have the required money for start-up and implementation of the systems and also the on-going maintenance costs. Very few health care facilities have enough cash on hand to make an upfront capital investment in a CHR system. Most do not budget it even as a start-up requirement for operation. To operate efficiently, the minimum and correct amount of resources behind it need to be available so that the health care facilities can reach a return of investment (Soumerai, 2010).

It is worth noting that public funding is tied to individual institutions where the amount allocated to a given health institution is proportional to its size. Larger hospitals achieve easily economies of scale and mainly information and resources needed across the organization. Several studies show positive relationship between ICT adoption and

organization size (Zhu et al., 2003; Pan and Jang, 2008) since they have more finances compared to smaller institutions. For successful adoption of the CHR system technology health facilities will need to budget for initial adoption costs, on-going costs and induced costs. Initial adoption costs include the cost needed to purchase and get a CHR system working in the health care professionals practice like the software and hardware, annual operating license fees; maintenance and support costs of both hardware and software like support staff.

According to Kiley (2000) having explored the pattern emerging after adoption found that there was a rise in organizational costs in the 70's: changes in wages, and the skill premium. Once the system is installed and running, there are other costs that are involved; On-going adoption costs in the maintenance and support of the running of the system. In order to have a CHR system working efficiently and effectively, there is long term costs that are going to be incurred they include annual licence fees, training, technical support staff employment, monitoring of the system outcomes, modifying, upgrading and maintaining CHRs. These require proper financial planning and extensive commitment in order to avoid system failure. Vendors charge a lot of money for after-sales service.

Induced adoption costs are involved in the transition from a paper to computerised system, such as the temporary work of data entry from papers to computerised systems. Such transition could pose a hindrance to productivity management especially if large adoption costs are incurred. This could include costs like hiring data entry clerks, proof-reading the entered data that take time and time is money, hiring a system administrator to take care of the system when technical issues arise and learning new skills. ICT often involves customization and custom-software, some of which remains unmeasured in official statistics. Because such complementary investments appear in official productivity statistics only as resource costs without the corresponding contribution to investment, productivity may be

mismanaged (Brynjolfsson and Hitt, 2000). These hidden costs that can occur with time could make the health care professionals worry that their practices will face substantial financial risks and that it could take years before they see a return on the investment.

## **2.6 Influence of training on adoption of CHR Systems**

Training boosts awareness and confidence level as users are able to overcome technophobia while relating usage to expected benefits (Sahay and Walsham, 2006). In countries that have assimilated ICT training for clinicians on the global stage, acceptance of eHealth and actual use is relatively high (Khan et al., 2012). Qureshi et al. (2013) argue that optimal use of IT towards the transformation of health care requires IT knowledge in the medical communities. As the disadvantaged users are playing catch up, the advantaged ICT users are always adopting newer technology and services.

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. Without adequate ICT skills, user involvement in selection and development of ICT systems 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. According to IT-Online (2007), although there are many ICT solutions available they are neither well-known nor much used an explanation for this anomaly is the limited availability of suitable technologies. In a study by Sood et al. (2004) which examined challenges that healthcare workforce face while implementing telemedicine in Tanzania, technology and computer literacy was considered to be the main challenge.

Omary et al (2010) attributes low adoption of eHealth among developing countries to lack of computer skills amongst the clinicians. There exists a training gap between high, medium, low and non-users. Computerised Health Records are hi-tech systems and complex hardware and software; therefore a certain level of computer knowledge is required for its effective use

(Miller and Sim, 2005). There are inadequate personnel with capacity for management and data analysis. The technical problems with CHRs are experienced as they are being used need to be improved as development progresses. Therefore, there are some barriers that exist relating to the technical issues of the systems, the technical capabilities of the health care professionals and of the suppliers which are: The health care professionals must show willingness to invest in Information Technology for enhanced quality assurance (Cibulskis and Hiawalyer, 2002).

According to Flanagan (2003), technology integration is meant to be cross curricular rather than become a separate course or topic in itself. In the same context most of the current generation of experienced health care professionals received their qualifications before IT programmes were introduced and for those still in study don't have that much concentration on studying IT related courses. CHR developers overlook the level of computer skills required from health care professionals to efficiently operate the system like good typing skills to enter patient medical information, notes and prescriptions into the CHRs and general knowledge on how database systems work could be lacking and could lead to typos. This general lack of skills could hinder the wide adoption of CHRs.

Also complexities of systems due to the amount of data they need to store refine and give a comprehensive report. For those with limited ICT training might have a problem with catching up on the usability of some ICT functions and systems. In general the systems might not have the appropriate graphical user interface that is easy to manoeuvre around. The lack of ICT training could lead the health care professionals to regard the CHR system as extremely complicated. Miller and Sim, (2005) argue that "CHRs could be challenging to use because of the multiplicity of screens, many unclear options and navigational aids". The complexity and usability problem could result in wrong system feeds and wrong interpretation. Further health care practitioners have to allocate time and effort to master the

systems so that they can handle the system effectively and efficiently. There could also be the concern of the ever changing technology. The machine based systems could become obsolete as time passes and not be valid to use any more as the systems reach their limitations (Miller and Sim, 2005).

The correlation between ICT skills and adoption of eHealth is also discussed by Ojo et al (2007) who points out that inadequate ICT skills in the health sector in Kenya explains the low adoption of eHealth. Hogan and 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. According to Miller and Sim (2005), the health care professionals might have some ICT training but the systems available cannot meet their special needs or requirements. Some health care professionals could also use the excuse that the systems are not “customized” for them but for larger health facilities. According to Randeree (2007), "customizability refers to the ability to be adapted of the technology system that fails to conform to specific needs of the user applications".

Health care professionals are not technical nor ICT experts, hence for them to operate the systems they need as much training and support for the systems and they might be reluctant to adopt the systems if they are not given adequate support (Ludwick et al, 2010). Simon et al (2007) similarly noted that “health care professionals struggle to get appropriate technical training and support for the systems from the vendor and if they do get this support it comes at a cost”. Health care professionals could struggle to have a positive attitude towards the CHR’s due to the poor or lack of after sale services provided by the vendor.

## **2.7 Theoretical Framework**

This study will be based on the Unified Theory of Acceptance and Use of Technology by Venkatesh et al in 2003. Developed from eight theories; Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned

Behaviour (TPB), Combined TAMTPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT), These researchers picked out four constructs from the eight models as most important facilitation reasons for which a person will accept a cutting-edge technology which are Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) are direct determinants of behavioural intention, while Facilitating Conditions (FI) are direct determinants of user behaviour. Performance Expectancy is defined as the performance of information technology for the user. Effort expectancy is defined as the degree of ease associated with use of the system. Social influence is defined as the degree to which an individual perceives the importance that others give to whether he or she should use the new system. Social influence is considered to be system or application-specific, whereas subjective norm relates to non-system-specific factors. Facilitation Conditions are defined as the degree to which an individual believes that an organization and or technical infrastructure exist to support their use of the system (Venkatesh et al., 2003). These relationships are moderated by gender, age, experience, and voluntariness of use. These moderators influence the behavioural intentions of accepting and adopting a technology system (Venkatesh et al., 2003).

Based on identification of these factors they considered to be significant in affecting a person's decision on whether or not to adopt a new technology, these researchers were able to create a model that studies common people's adoption decision and innovation behaviours. It is also suitable to be used in corporate environments if one wants to know the degree of employee motivation when adopting new software.

The strengths of the UTAUT theory are; it's very comprehensive, its usage is not limited to mono-industry but can be extended to other sectors and it provides a refined view of how the determinants of intention and behaviour evolve over time while its limitation is that it's inflexible to adapt to other different contexts.



The UTAUT theory fits into the study as it talks about how the attitude of users of technology affects their decision on whether or not to adopt a new technology, also touches on infrastructure availability and how it facilitates the adoption of a particular technology it also addresses on issues to do with training and how it is key to have skills to enable ease of use of a particular technology hence facilitating adoption. Thus was chosen as the ideal theory for this study since it has been widely used in previous studies related to technology acceptance too.

## 2.8 Conceptual Framework

The variables in this study are inter-related as shown in figure 2.1

### Independent variable

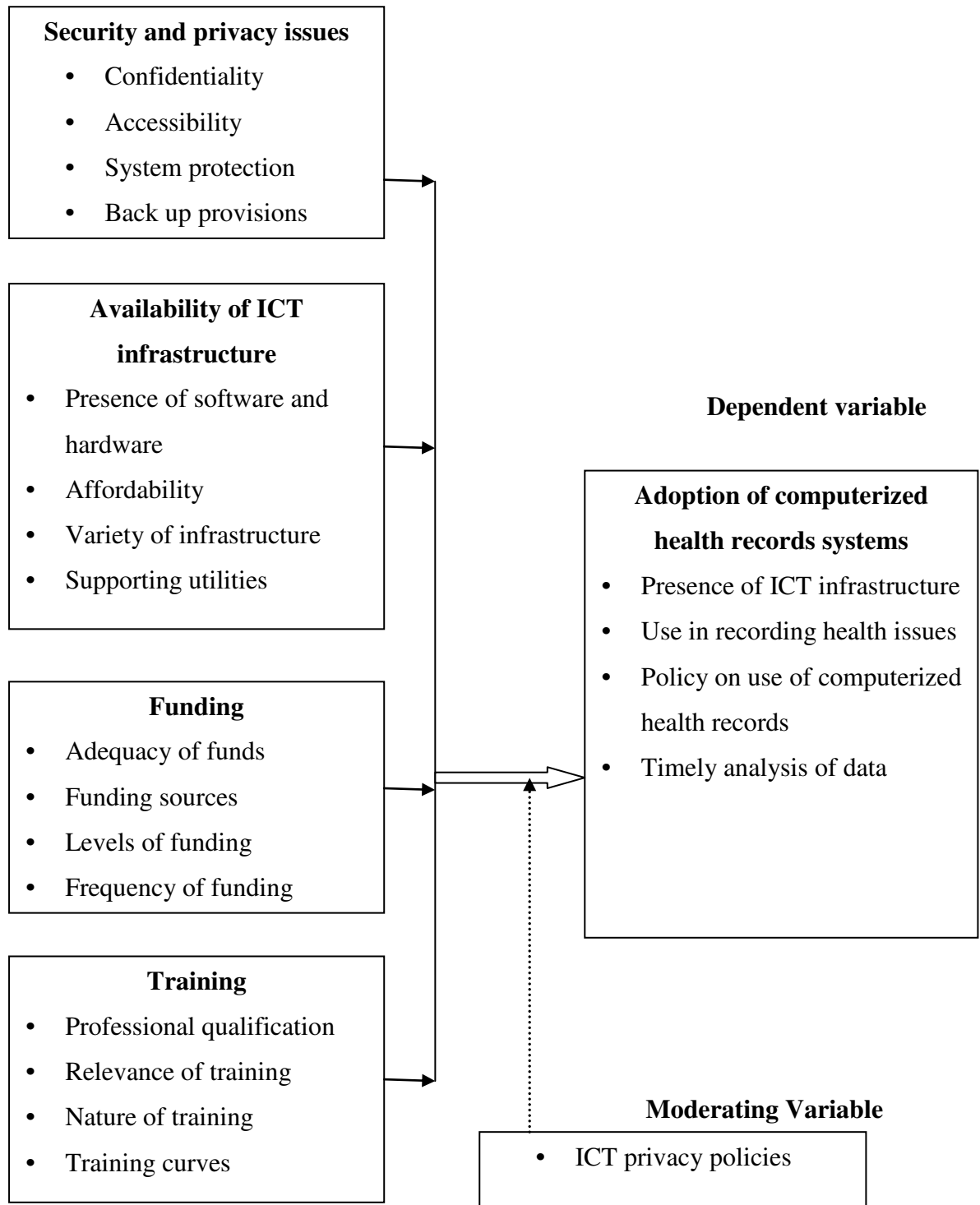


Figure 2.1: Conceptual framework

Security and privacy credentials given to the authorised users, computerised health record systems deal with sensitive medical information on patients which should be treated with confidentiality. It is of utmost importance to keep such information safe because if otherwise revealed to unauthorised party then it could create legal issues. Lack of clear security standards ethical issues are likely to arise the confidentiality of the patient healthcare information may be broken either internally, by accidental disclosure, insider curiosity or by insider subordination or may be broken from outside intrusion through unauthorised access . Health care professionals would therefore have doubts whether CHRs are secure for patients' information and records and fear that data in the system may be accessible to those who are non-authorized parties.

ICT infrastructure plays a key role in public health. Transmission of health information between 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. Due to poor ICT infrastructure and internet penetration in developing countries, the majority of them cannot support internet deployment, which in turn, hampers eHealth adoption. Even in developing countries that have high internet penetration, bandwidth may still be a challenge, thereby limiting adoption of telemedicine and other internet based eHealth applications.

The major concern is whether health care facilities have the required finances for start-up and implementation of the systems and also the on-going maintenance costs. Very few health care facilities have enough cash on hand to make an upfront capital investment in a CHR system. Most do not budget it even as a start-up requirement for operation. To operate efficiently, the minimum and correct amount of resources behind it need to be available so that the health care facilities can reach a return of investment.

Some health care professionals could use the excuse that the systems are not “customised” for their use due to inadequate technical capacity for them to manage and analyse data. The insufficient technical knowledge and skills that they have makes them feel they are not well equipped to deal with CHRs, and that this results in resistance. The technical problems with are usually experienced as they use the CHRs therefore, there is need to be improve their technical competencies as development progresses.

## **2.9 Knowledge gaps identified in the literature**

Boonstra and Broekhuis (2010), in their study on Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions point out that for successful implementation of ICT in the health sector there is need to a complete exchange of the old personnel that had gotten use with the paper work type of doing things. This is because of their attitudes and perception of new technology introduction.

According to a study conducted by Micevska Maja (2005) which focused on the complementarities that exist between information technologies and public health promotion based on two countries, Bangladesh and Lao, Availability of these infrastructures would determine the pattern of adoption and usage of technology. This is because if there is no infrastructure in place, it limits the adoption of technology.

Studies done by Omary et al (2010) and Abdullah (2012) to determine the challenges to E-Healthcare Adoption in Developing Countries: A Case Study of Tanzania, low funding of health sector by the government makes it difficult to allocate much money for acquisition of ICT resources needed in the health sector. This is because limited fiscal support from stakeholders will result in limited financial resources thus there is not enough monies to allocate in the budget to procure these ICT infrastructures.

In a study by Sood et al.'s (2004) which examined challenges that healthcare workforce face while implementing telemedicine technology in India, computer literacy was considered

to be the main challenge. This is because insufficient technical knowledge and skills will make the physicians feel they are not well equipped to deal with CHRs, and this will result in resistance to introduction of new technology.

Health facilities cannot adequately account for their patients' records. The move by the governor pledging to set aside 25 million shillings to help digitize the medical records seems encouraging and promising but still patients registering in health facilities in Kisii County seem to be making use of paper work. Hence, this study will seek to examine the factors that influence adoption of Computerized Health Records in Kisii County specifically.

## **2.10 Summary of literature review**

The literature related to the study was reviewed based on the themes identified in the objectives. The first bit dealt with security and privacy issues on computerized health records adoption in various parts of the world and how it affects the adoption. The second theme talked about availability of ICT infrastructure and how its availability influenced the rate at which computerized health record systems can be adopted. The third bit dealt with financial management skills; the literature revealed how availability of funds influenced adoption rates of computerized health record systems. The fourth theme talked about how ICT training improved effective and efficient use of computerized health record systems and the lack of ICT skills created a technological barrier thereby causing resistance hence influencing the CHRs adoption rates. The theoretical, conceptual frameworks on which the study was pegged lastly, the knowledge gaps.

## 2.11 Operationalization Table

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

**Table 2.1: Operationalization Table**

<b>Research objectives</b>	<b>Type of variable</b>	<b>Indicators</b>	<b>Measurement</b>	<b>Data Collection instrument</b>	<b>Scale</b>	<b>Data analysis</b>	<b>Tools</b>
1. To establish how security and privacy issues influence the adoption of computerized health record systems in Kisii County.	Independent variable	Confidentiality Accessibility System protection Back up provisions	Records	Questionnaire	Nominal Nominal Nominal	Descriptive statistics	Percentage, frequency distribution

2. To determine how availability of ICT infrastructure influences the adoption of computerized health record systems in Kisii County.	Independent	Presence of software and hardware  Affordability  Variety of infrastructure  Supporting utilities	Survey reports and  Field work reports	Questionnaire	Nominal  Nominal  Nominal	Descriptive statistics	Percentage, frequency distribution
3. To assess how funding influences adoption of computerized health record systems in Kisii County.	Independent	Adequacy of funds  Funding sources  Levels of funding  Frequency of funding	Financial records	Questionnaire	Nominal  Nominal  Nominal		Percentage, frequency distribution
4. To examine the extent to which training influences	Independent	Professional qualification  Relevance of training	Schedules and  Document	Questionnaire	Nominal  Nominal	Descriptive statistics	Percentage, frequency

the adoption of computerized health record systems in Kisii County.		Nature of training  Training curves	ation reports		Nominal  Nominal		distrib ution
5. Adoption of CHRs in Kisii County	depend ent variabl e	Presence of ICT infrastructure  Use in recording health issues  Policy on use of computerized health records  Timely analysis of data	Survey reports  and Field work reports	Question naire	Nominal  Nominal  Nominal	Descri ptive statisti cs	Percen tage, freque ncy distrib ution



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter contains the research design, target population of the study, sample size and sampling procedures, research instruments, instrument validity, instrument reliability, data collection procedures and methods of data analysis which were deployed by the investigator when carrying out the study. It also contains the ethical considerations.

#### **3.2 Research Design**

The study adopted a descriptive survey research design. According to Kothari (2003), a descriptive survey research is one that is concerned with describing the characteristics of a particular individual or of a group. In a descriptive survey research objectives are predetermined which allows data collection to be relevant and sufficient to the study problem. The descriptive survey research design is suitable in situations where the study tends to describe and portray characteristics of an event, situation or a group of people, community or a population as they exist. This design was applicable because there was need to describe respondents with regard to factors that influence adoption of computerized health records systems by health facilities in Kisii County.

#### **3.3 Target Population**

Kombo and Tromp (2006) define a population as a group of individual objects or items from which samples are taken for measurement. Target population is defined by Best and Kahn (2006) as a small portion of the population selected for observation and analysis. According to e-Health Kenya Health Facilities list, in Kisii County 2015 there are of 168 registered health facilities comprising of 22 Hospitals, 29 Health centres, Maternity and nursing home and 101 Dispensaries and 16 clinics. The study respondents targeted to assist

were the health care professionals' in-charge in each facility; that is the heads and their deputies giving a total of 336. The population targeted is as shown in Table 3.1.

### **3.4 Sample size and Sampling selection**

#### **3.4.1 Sample Size**

According to Kothari (2003) sample size refers to the number of items to be selected from a universe to constitute a sample, the sample should be optimum. That is, one that fulfils the requirements of efficiency, representation, reliability and flexibility. According to Mugenda (2003) 10% to 30% of the total accessible population is appropriate for the study. Based on that, a sample size of 30% was used for this study; that is, 100 health facilities heads and deputies selected from a target population of 336.

#### **3.4.2 Sample Selection**

Orodho (2004) defines sample selection as; “the process of selecting a sub set of cases in order to draw conclusion about the entire set”. Stratified random sampling was used in carrying out the study as per the different health facilities. Further, simple random sampling was undertaken in each stratum it was appropriate because it gives each possible sample combination an equal probability of being picked up and each item in the entire population to have an equal chance of being included in the sample (Mugenda, 2003). Stratified random sampling with strict randomization involved dividing the population into homogeneous subgroups (stratum); that is, Hospitals, Health centres, Maternity and nursing home, Dispensaries and Clinics then performing simple random sampling on the 336 health care professionals in-charge in each facility from each stratum independently of each other (Kothari, 2003).

### 3.1: Target Population and Sample Size

Stratum	Target Population	Sample Percentage (%)	Sample Size
Hospitals	44	30	13
Health centres, Maternity and nursing homes	58	30	17
Dispensaries	20	30	60
Clinic	32	30	10
<b>TOTALS</b>	<b>336</b>	<b>30</b>	<b>100</b>

### 3.5 Data Collection Instruments

A questionnaire was used as the main data collection instrument. It was developed in such a manner that most items are closed ended, open ended and matrix questions. It contained six sections. Section 1 captured information on the demographic characteristics and profiles of the respondents such as gender, age, level of education, type of practice, years of experience, as well as current level of information technology adopted. Section 2 contained questions relating to attitude of the health professionals towards adopting CHRs. Section 3 contained questions on availability of ICT infrastructure by the health care practitioners'. Section 4 contained questions relating to the funding in CHRs adoption. Section 5 contained questions relating to training and other support functionalities in regards to the health care practitioners and Section 6 contained questions relating to the adoption of CHR systems.

For the closed-ended questions, a likert scale shall be used. The strongly agreed responses Will be scored at 5 for direct positive while those of strongly disagree was be scored at 1 for direct negative responses. Closed ended questions were included because they are easier to administer and to analyze. The questionnaires facilitated the evaluation of factors influencing adoption of computerized health records systems in Kisii County.

### **3.5.1 Pilot testing of the instrument**

Pretesting was done in the neighbouring Nyamira County as it reflected features similar to those in Kisii County. Based on Mugenda and Mugenda, (2003) recommendations that a minimum sample of 1-10% is adequate for educational research of less than a thousand participants, a pre-test of 10% of the actual study Sample size was used. The results of the pre-test study were used to improve the questionnaire items such that questions that were ambiguous were reframed to make them clear.

### **3.5.2 Validity of the instrument**

Validity is defined by Mugenda (2003) as the accuracy and meaningfulness of inferences which are based on the research results. Validity is the degree to which results obtained from the analysis of data actually represents the phenomenon under study. The validity of the instrument was established through expert judgement by the lecturers, peer review and adequate coverage of the objectives.

### **3.5.3 Reliability of the instrument**

Reliability is the measure of the degree to which research instrument yields consistent results after repeated trials (Mugenda, 2003).It refers to the consistence of the scores obtained. An instrument can be said to be reliable when it can accurately measure a variable and provide the same consistent results over a period of time to the same group of identified respondents (Best and Kahn, 2006). According to Kothari (2003) if the quality of reliability is

satisfied by an instrument, then while using it we can be confident that the transient and situational factors are not interfering.

In this study, split half reliability method was used .questionnaire items were divided into two equal parts on the basis of odd and even appearances. Pearson's product coefficient of correlation (r) applying the spearman's brown prophecy formula to come up with an alpha value. Reliability with an alpha of 0.7 and above is acceptable.

### **3.6 Data Collection Procedures**

Prior to the commencement of data collection, the researcher sought to obtain the necessary documents for the research with the assistance of the school of distant and continuing education of the University of Nairobi. This will form basis of securing the research permit from the National Council for Science and Technology. The researcher sent an introductory letter to the identified respondents and requested them to participate in the study. Once the respondents agree to undertake the study, the questionnaires were dropped for the respondents to fill at their own convenient time. Ethical considerations were clearly communicated and adhered to before commencement on the data collection process. The research instrument was clearly communicated to the assistants in order to gather the required data.

The researcher intends to collect data from 100 officials' in-charge; the heads and deputies of the registered health facilities in Kisii County. The entire data collection and analysis exercise was expected to take approximately one month. After the data collection, clean up, coding and removal of errors and inconsistencies will be undertaken. The data from the field will be coded according to the themes to be researched. The responses were then summarized with percentages, frequency counts. Inferences shall be drawn about a particular population from the responses of the sample population.

### **3.7 Methods of Data Analysis**

Data analysis is the computation of certain indices or measures along with searching for patterns of relationship that exist among the data groups (Kothari, 2003). Data analysis according to Best and Kahn (2006) involves working to uncover patterns and trends in data sets. This will be done by coding according to the themes researched and analysed as per the research. Data was analysed using descriptive statistics such as frequencies and percentages and presented using frequency distribution tables. SPSS was the tool for analysis aided by a computer.

### **3.8 Ethical Considerations**

The research began by seeking permission from the relevant authorities in the health facilities. Accordingly, the researcher ensured that respect, courtesy, privacy and justice were adhered to. The research processes and procedures used were based on a voluntary informed consent employing a valid research design with a sample selection appropriate for the purpose of the study. In addition the researcher went to the field with no biasness so as to give the respondent a fair ground and get to the root of the issues in order to understand the research questions objectively.

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

#### 4.1: Introduction

This section focuses on data analysis presentation, interpretation and discussion. Data was analyzed on the basis of the key study objectives.

#### 4.2: Response Rate

$$100/120 * 100 = 83\%$$

120 questionnaires were administered, 100 were duly filled and returned giving a response rate of 83 % as depicted in table 4.1 below.

**TABLE 4.1: Response Rate**

<b>Stratum</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Hospitals	13	11
Health center, Maternity and nursing homes	17	14
Dispensaries	60	50
Clinics	10	8
<b>TOTAL</b>	<b>100</b>	<b>83</b>

The researcher concluded that the questionnaires returned were adequate for this analysis as it conforms to Mugenda and Mugenda (2003) stipulation, that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good while a response rate above 70% is excellent.

### 4.3: Demographic Characteristics of Respondents

Demographic characteristics were important for this study since computerized health record systems are a new technology and it is believed that the populations' demographic characteristics have a significant influence on their adoption. These include: Age, Gender, marital status, years in service, area of operation and the level of education.

**TABLE 4.2: Distribution of Respondents by Gender**

Category	Frequency	Percentage (%)
Male	84	84
Female	16	16
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the gender of the respondents in order to find out if all genders were well represented. From table 4.2 above, it was established that out of 100 respondents, a majority were male 84% (84) while 16% (16) were female. This showed that equal gender representation was an issue that influenced the adoption of CHRs.

**TABLE 4.3: Distribution of Respondents by age**

Age	Frequency	Percentage (%)
Above 50	53	53
40-50	40	40
30-40	31	31
20-30	18	18
20 and below	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>



The study sought to find out 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. From table 4.3 above, it was established that out of 100 respondents, 53% (53) were 50 years and above, between the ages of 40 to 50 were 40% (40), the age bracket viewed as the most resistant to change. Between ages 30 to 40 were 31% (31) with the right motivation and leadership this age bracket can be made to conform to changes in the organization and those between the ages of 20 to 30 were 18% (18) the age group that is viewed as technology receptive. This shows that it will be hard for any new technology to be adopted.

**TABLE 4.4: Distribution of Respondents by marital status**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Married	60	60
Widowed	20	20
Divorced	15	15
Single	5	5
other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to find out if marital status of respondents would influence adoption. From table 4.4 above, it was established that out of 100 respondents, 60% (60) were married and, 20% (20) were widowed, 15% (15) were divorced and 5% (5) were single. This showed that married couples had other family matters to attend to after working hours. They do not have much time to spare in learning the new technology hence it was be hard for any new technology to be adopted.

**TABLE 4.5: Distribution of Respondents by years in service**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Above 11	50	50
8-11	30	30
4-7	15	15
1-3	5	5
One year and below	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

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. From table 4.5 above out of 100 respondents, 50 (50 %) of the health care practitioners had over eleven years of experience, those between eight to eleven years were 30 (30%), between 4 to 7 years were 15 (15%), 5 (5 %) have worked for between one to three years. There were no health care practitioners who have a working experience of less than one year. From this analysis, majority of the healthcare providers have more than five years of experience. This showed that all the health care practitioners had a knowledge basis of patient interaction.

**TABLE 4.6: Distribution of Respondents by area of operation**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Clinical	60	60
Clerical	30	30
management	6	6
administrative	4	4
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study also sought to establish the distribution of Respondents by area of operation therefore the respondents were asked to state their area of operation. From table 4.6 above out of 100 respondents, 60 (60 %) were specialized in clinical area, 30 (30%) were specialized in clerical work, 6 (6%) were specialized in management and 4 (4 %) were specialized in administrative functions. This showed that most of the health care practitioners were not ICT specialists thus a barrier to adoption of CHRs.

**TABLE 4.7: Distribution of Respondents by level of education**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Tertiary	82	82
University	18	18
Secondary	0	0
Primary and below	0	0
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the level of education of the respondents in order to find out if academic qualification of the health care practitioners influenced adoption. From table 4.7 above out of 100 respondents, 82 (82%) had gone up to tertiary level, 18 (18%) gone up to university, and none was below secondary school training. This shows that the target population comprised of learned people hence will be receptive to adopting a new technology. This being a new technology, it was believed that the learned population would be more receptive to technology.

#### 4.4: Security and Privacy Issues on Adoption of CHRs

The study sought to find out if security and privacy issues influenced adoption of CHRs. The respondents were requested to state whether these systems offered confidentiality thresholds, they were accessible, they offered back up provisions and system protection.

**TABLE 4.8: Distribution of Respondents by confidentiality thresholds**

Category	Frequency	Percentage (%)
Strongly disagree	51	51
Disagree	40	40
Neutral	5	5
Agree	4	4
Strongly agree	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish whether confidentiality thresholds had an influence on the adoption of the CHRs. From table 4.8 above out of 100 respondents, 51 (51%) strongly disagree that these systems offered confidentiality, 40 (40%) disagree that these systems offered confidentiality, 5 (5%) were indifferent, 4 (4%) agreed that these systems offered confidentiality. This shows that the target population had a negative opinion that these

systems offered confidentiality. This being a new technology, it was believed that the users' attitude had a major impact towards adoption of CHRs.

**TABLE 4.9: Distribution of Respondents by accessibility**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Indifferent	50	50
Difficult	42	42
Easily	8	8
Other	0	0
Very easily	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish whether accessibility to these systems and whether it had an influence on the adoption of the CHRs. From table 4.9 above out of 100 respondents, 50 (50%) were indifferent about gaining access to CHRs in their facilities, 42 (42%) indicated it was difficult to gain access to CHRs in their facilities, 8 (8%) indicated they easily gained access to CHRs in their facilities. This shows that a majority of the respondents were not sure as to how they can gain access to these systems as well as found it difficult to access the CHRs.

**TABLE 4.10: Distribution of Respondents by system protection**

Category	Frequency	Percentage (%)
Other	90	90
Authorization passwords	8	8
Presence of systems analyst	2	2
Administration of firewalls	0	0
Safety gadgets	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish whether these systems were protected how it influenced adoption of the CHRs. From table 4.10 above out of 100 respondents, 90 (90%) were indifferent systems protection on the CHRs in their facilities, 8 (8%) indicated they used authorized passwords, 2 (2%) indicated they had a systems analyst to enforce system protection. This shows that a majority of the respondents were not confident about the systems level of security protection mechanisms thus a barrier to adopting CHRs.

**TABLE 4.11: Distribution of Respondents by back up provisions**

Category	Frequency	Percentage (%)
Hard copies	85	85
File system	10	10
Hard disc drives	5	5
Database	0	0
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish whether these systems offered back up provisions and whether it influenced adoption of the CHRs. From table 4.11 above out of 100 respondents, 85 (85%) were using hardcopies to back up data, 10 (10%) indicated having a computerized filing system, 5 (5%) indicated they used hard disks to back up data and none had incorporated databases. This shows that a majority of the respondents were still using traditional methods of archiving data and quite few were using computers and other peripherals to store their data. This shows that most of the facilities were not equipped with infrastructure to support electronic back up hence a hindrance to adoption of CHRs.

**TABLE 4.12: Distribution of Respondents by own opinion**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Not secured	98	98
Secured	2	2
<b>TOTAL</b>	<b>100</b>	<b>100</b>

From table 4.12 above out of 100 respondents, 98 (98%) were of the opinion that they were not secured from both internal and external threats, 2 (2%) indicated that they were adequately secured. This shows that a majority of the respondents were not confident about going computerized as security was a major concern thus hindering adoption of CHRs.

#### **4.5: Availability of ICT Infrastructure on Adoption of CHRs**

The study sought to find out if the availability of ICT infrastructure by the respondents influenced adoption of CHRs. The respondents were requested to state the availability of computers, printers, and other accessories.

**TABLE 4.13: Distribution of Respondents by presence of ICT infrastructure**

<b>Scale</b>	<b>Frequency</b>	<b>Percentage (%)</b>
2	87	87
4	8	8
1	3	3
3	2	2
5	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish whether the presence of the ICT infrastructure had an influence on the adoption of the CHRs. From table 4.13 above out of 100 respondents, 87 (87%) had ranked presence of the ICT infrastructure at a scale of 2, 8 (8%) had ranked presence of the ICT infrastructure at a scale of 4, 3 (3%) had ranked presence of the ICT infrastructure at a scale of 1, 2 (2%) had ranked presence of the ICT infrastructure at a scale of 3. This shows that the target population was of the opinion that there was lack of adequate ICT infrastructure in the facility. This being a new technology, it was believed that there should have been presence of adequate ICT infrastructure to support adopting the CHRs technology.



**TABLE 4.14: Distribution of Respondents by affordability**

Category	Frequency	Percentage (%)
Expensive	50	50
Other	30	30
Affordable	10	10
Very affordable	8	8
Less affordable	2	2
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish whether the cost aspect had an influence on the adoption of the CHR. From table 4.14 above out of 100 respondents, 50 (50%) felt that these infrastructure were expensive, 30 (30%) were not aware of the costs of acquiring the infrastructure as they did not use it, 10 (10%) felt that the infrastructure was affordable, 10 (10%) felt that the cost of acquiring the infrastructure was cheap and only 2% (2) felt that it was very cheap to procure the infrastructure. This shows that the target population was of the opinion that they were not in a position to procure adequate ICT infrastructure for the facility as it was expensive hence a hindrance to adopting the CHRs.

**TABLE 4.15: Distribution of Respondents by variety of ICT infrastructure**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Computers	62	62
Websites	4	4
Computer labs	2	2
Networked systems	2	2
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the types of infrastructures available within the facilities and how they influenced adoption of the CHRs. From table 4.15 above out of 100 respondents, 62 (62%) indicated to have computers, 4 (4%) had websites for their organization, 2 (2%) were installed with computer labs and 2(2%) had networked systems. This shows that a majority of the facilities were not equipped with a variety of infrastructure required to facilitate adoption of CHRs.

**TABLE 4.16: Distribution of Respondents by supporting utilities**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Wet cells	46	46
Electricity	30	30
Power generators	14	14
Solar panels	10	10
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish whether the availability of support utilities influenced the adoption of the CHR. From table 4.16 above out of 100 respondents, 46 (46%) were using wet cells, 30 (30%) were connected to electricity, 14 (14%) had power generators and 10 (10%) used solar panels. This shows that most facilities were lacking standard support utilities for adopting the CHRs.

**TABLE 4.17: Distribution of Respondents by own opinion**

Category	Frequency	Percentage (%)
Not well equipped	88	88
Well equipped	8	8
Indifferent	2	2
<b>TOTAL</b>	<b>100</b>	<b>100</b>

From table 4.17 above out of 100 respondents, 88 (88%) were of the opinion that they were not well equipped to implement CHR, 8 (8%) indicated that they were well equipped with infrastructural utilities and capable to handle CHR implementations and 2 (2%) were not sure about their infrastructural capacities to accommodate CHR installations. This shows that a majority of the respondents were not confident about their facilities' infrastructural capacities to be able to house CHR implementations.

#### **4.6: Training and Adoption of CHR Systems**

The study sought to find out the level of ICT training skills that the health care workers have. The respondents were requested to indicate their level of skills.

**TABLE 4.18: Distribution of Respondents by professional training**

Category	Frequency	Percentage (%)
Diploma	82	82
Degree	18	18
Certificate and below	0	0
Other	0	0
Post graduate	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the level of professional training of the respondents in order to find out if professional training of the health care practitioners influenced adoption of CHR. From table 4.18 above out of 100 respondents, 82 (82%) had a diploma, 10 (10%) had a degree, 8 (8%) had a certificate and below and none had a post graduate. This shows that the target population literacy levels were average hence was not going to be a challenge to adopting a new technology.

**TABLE 4.19: Distribution of Respondents by area of training**

Category	Frequency	Percentage (%)
Medical	90	90
ICT	6	6
clerical	2	2
Business management	2	2
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the area of specialization of the respondents and how it influenced adoption of CHRs. From table 4.19 above out of 100 respondents, 90 (90%) were medical specialists, 6 (6%) were ICT specialists, 2 (2%) had a background in clerical work and 2 (2%) were trained in business management. This shows that the target population was well trained in their fields of specialization but a majority were ICT illiterates hence posing a challenge adopting CHRs as they are a new ICT technology which they lack capacity to operate.

**TABLE 4.20: Distribution of Respondents by nature of training**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Other	82	82
Informally	10	10
Formally	6	6
Experience	2	2
Workshops	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the nature of ICT training the respondents have access to and how it influenced adoption of CHRs. from table 4.20 above out of 100 respondents, 82 (82%) had other unconventional ways to learn the CHRs, 10 (10%) were being trained informally, 6 (6%) were being trained formally and 2 (2%) were learning through experience. This shows that the professionals are inadequately put through the rigours of formalized training hence lack of skills and self efficacy in operating the CHRs thus a hindrance to adoption of CHRs.

**TABLE 4.21: Distribution of Respondents by training curves**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Hardly	90	90
Frequently	8	8
Occasionally	2	2
Other	0	0
Very frequently	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the frequency of training the health care practitioners receive and how it influences adoption of CHR. From table 4.21 above out of 100 respondents, 90 (90%) hardly receive training, 8 (8%) frequently received training and 2 (2%) occasionally received. This shows that the target population is not put through training as frequently as it should to hone their skills and competencies in operating the CHRs thus a hindrance to adoption of CHRs.

**TABLE 4.22: Distribution of Respondents by own opinion**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Not well trained	90	90
Indifferent	6	6
Well trained	4	4
<b>TOTAL</b>	<b>100</b>	<b>100</b>

From table 4.22 above out of 100 respondents, 90 (90%) were of the opinion that they were not well trained to handle CHR, 4 (4%) indicated that they were well trained and

capable to handle CHR operations and functionalities and 6 (6%) were confused about their abilities to operate CHR. This shows that a majority of the respondents were sceptical about adopting CHR as they felt lacking in skills hence not confident about adopting CHR.

**4.7: Funding and Adoption of CHR Systems.**

The study sought to find out if funding influence the adoption of CHR systems. The respondents were requested to indicate their major source of funding, levels of funding and frequency among others.

**TABLE 4.23: Distribution of Respondents by adequacy of funds**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Strongly disagree	51	51
Disagree	40	40
Neutral	5	5
Agree	4	4
Strongly agree	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish how adequately funded the health care facilities are and how it influenced adoption of CHR. From table 4.23 above out of 100 respondents, it was established that majority 51 (51%) of the respondents strongly disagree to being adequately funded, 40 (40%) disagree, 5 (5%) are indifferent and 4 (4%) agree that they are adequately funded. This indicates poor funding regimes across most of the facilities thus a hindrance to CHR adoption as it required a big budget to implement.

**TABLE 4.24: Distribution of Respondents by sources of funding**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
sponsors	51	51
Facilities budget	40	40
Commercial loans	7	7
Government grants	2	2
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the major sources of funding of the health care facilities and how it influenced adoption of CHR. From table 4.24 above out of 100 respondents, it was established that majority 51 (51%) of the respondents got funding from sponsors, 40 (40%) from the facilities budget, 7 (7%) from commercial loans and 2 (2%) from the government. This indicates poor funding regimes across most of the facilities thus a hindrance to CHR adoption as it required a big budget to implement.

**TABLE 4.25: Distribution of Respondents by levels of funding**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Other	74	74
Initial acquisition	10	10
Installation	8	8
Maintenance	8	8
Systems review	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>



The study sought to establish the different levels of funding of the health care facilities and how they influenced adoption of CHRs. From table 4.25 above, it was established that out of 100 respondents, 74 (74%) of the respondents did not get funding from sponsors, 10 (10%) were funded during initial acquisition, 8 (8%) were funded during installation and 8 (8%) were funded during maintenance. This shows that funding is not consistent throughout the implementation phases thus a hindrance to CHRs adoption.

**TABLE 4.26: Distribution of Respondents by frequency of funding**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Semi-annually	42	42
Bi-annually	36	36
Annually	20	20
Monthly	0	0
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the frequency of funding of the health care facilities and how it influenced adoption of CHRs. From table 4.26 above, it was established that out of 100 respondents, 42 (42%) of the respondents got funding from sponsors semi-annually, 36 (36%) bi-annually, 20 (20%) annually. This indicates poor funding regimes across most of the facilities thus a hindrance to CHRs adoption as the facilities had to wait for very long periods before they could receive funding from the sponsors.

**TABLE 4.27: Distribution of Respondents by own opinion**

Category	Frequency	Percentage (%)
Not adequately financed	92	92
Adequately financed	8	8
<b>TOTAL</b>	<b>100</b>	<b>100</b>

From table 4.27 above out of 100 respondents, 92 (92%) were of the opinion that they were inadequately funded to budget for CHRs, 8 (8%) indicated that they were adequately financed to adopt CHRs. This shows that a majority of the respondents were lacking the required capital resources to be able to adopting CHRs.

#### **4.8: Adoption of Computerized Health Records**

The study sought to find out how some factors affected the adoption of CHR systems. The respondents were asked to indicate whether there was policy on CHRs usage, timely analysis of patient data, use of CHRs and presence of ICT infrastructure.

**TABLE 4.28: Distribution of Respondents by presence of ICT infrastructure**

Category	Frequency	Percentage (%)
1	93	93
4	6	6
3	4	4
2	0	0
5	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the presence of CHRs at the health care facilities to determine the adoption pattern. From table 4.28 above out of 100 respondents, it was established that majority 93 (93%) of the respondents indicated they lack of CHRs, 6 (6%) indicated they had CHRs to a moderate extent and 4 (4%) had adequately installed CHRs. This indicates a slow adoption pattern amongst the health facilities.

**TABLE 4.29: Distribution of Respondents by use of CHRs**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Hardly	90	90
Very frequently	8	8
Frequently	2	2
Occasionally	0	0
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the use of CHRs at the health care facilities to determine the usage pattern. From table 4.29 above out of 100 respondents, it was established that majority 90 (90%) of the respondents indicated the use of CHRs had become a normal routine for them, 8 (8%) indicated they very frequently used the CHRs and 2 (2%) were frequently using the CHRs. This indicates a low rate of usage in a majority of the facilities.

**TABLE 4.30: Distribution of Respondents by timely analysis of patient data**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Hardly	85	85
Very often	8	8
Indifferent	5	5
Often	2	2
Other	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish the use of CHR's at the health care facilities to determine the usage pattern. From table 4.30 above out of 100 respondents, it was established that majority 90 (90%) of the respondents indicated the use of CHR's had become a normal routine for them, 8 (8%) indicated they very frequently used the CHR's and 2 (2%) were frequently using the CHR's. This indicates a low rate of usage in a majority of the facilities

**TABLE 4.31: Distribution of Respondents by policy on CHR's usage**

<b>Category</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Other	87	87
High	6	6
Moderate	4	4
low	3	3
Very high	0	0
<b>TOTAL</b>	<b>100</b>	<b>100</b>

The study sought to establish there were policy guidelines in place to aid the usage of CHR's at the health care facilities. From table 4.31 above out of 100 respondents, it was

established that majority 87 (87%) were not aware whether such policies were there as they had not adopted the technology yet, 6 (6%) indicated had a policy on the usage of the CHRs 4 (4%) indicated that there was a policy but was not enforced into practice and 3 (3%) did not have a CHRs usage policy guideline. This indicates an average standard with regards to CHRs usage

## CHAPTER FIVE

### SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter presented a summary of the study findings, conclusions and recommendations. The findings were summarized in line with the objectives of the study which were funding, training of health care practitioners, availability of ICT infrastructure and security and privacy issues. These independent variables were studied against the dependent variable which is adoption of computerized health records by health facilities.

#### 5.2: Summary of Findings

**Table 5.1: Summary of findings**

<b>Objective</b>	<b>Data collection instrument</b>	<b>Type of analysis</b>	<b>findings</b>
Security and privacy issues on adoption of CHR Systems	Questionnaire	Descriptive	The study showed that 51 (51%) strongly disagree that these systems offered confidentiality, 40 (40%) disagree that these systems offered confidentiality. 42 (42%) indicated it was difficult to gain access to CHRs in their facilities, 8 (8%) indicated they easily gained access to CHRs in their facilities. 85 (85%) were using hardcopies to back up data, 10 (10%) indicated having a computerized filing system, 5 (5%) indicated they used hard disks to back up data. 98 (98%) were of the opinion that they were not secured from both internal and external threats.

<p>Availability of ICT infrastructure on adoption of CHR Systems</p>	<p>Questionnaire</p>	<p>Descriptive</p>	<p>The study showed that 87 (87%) had ranked presence of the ICT infrastructure at a scale of 2, 8 (8%) had ranked presence of the ICT infrastructure at a scale of 4, 3 (3%) had ranked presence of the ICT infrastructure at a scale of 1, 2 (2%) had ranked presence of the ICT infrastructure at a scale of 1. 50 (50%) felt that these infrastructure were expensive, 30 (30%) were not aware of the costs of acquiring the infrastructure as they did not use it, 10 (10%) felt that the infrastructure was affordable. 62 (62%) indicated to have computers, 6 (6%) had websites for their organization, 2 (2%) were installed with computer labs and 2(2%) had networked systems. 46 (46%) were using wet cells, 30 (30%) were connected to electricity, 14 (14%) had power generators and 10 (10%) used solar panels. 88 (88%) were of the opinion that they were not well equipped to implement CHRs.</p>
<p>Funding on adoption of CHR systems</p>	<p>Questionnaire</p>	<p>Descriptive</p>	<p>The study established that , 51 (51%) of the respondents strongly disagree to being adequately funded, 40 (40%) disagree, 5 (5%) are indifferent. 51 (51%) of the respondents got funding from sponsors, 40 (40%) from the facilities budget, 7 (7%) from commercial loans 10 (10%) were funded during initial acquisition, 8 (8%) were funded during installation and 8 (8%) were funded during maintenance. 42 (42%) of the respondents got funding from sponsors semi-annually, 36 (36%)</p>

			bi-annually, 20 (20%) annually. 92 (92%) were of the opinion that they were inadequately funded to budget for CHR.
Training on adoption of CHR Systems	Questionnaire	Descriptive	The study showed that 82 (82%) had a diploma, 10 (10%) had a degree, 8 (8%) had a certificate and below and none had a post graduate. 90 (90%) were medical specialists, 6 (6%) were ICT specialists, 2 (2%) had a background in clerical work and 2 (2%) were trained in business management. 82 (82%) had other unconventional ways to learn the CHRs, 10 (10%) were being trained informally, 6 (6%) were being trained formally and 2 (2%) were learning through experience. 90 (90%) hardly receive training, 8 (8%) frequently received training. 90 (90%) were of the opinion that they were not well trained to handle CHR.

### 5.3 Conclusions

The review on the factors that influence adoption of CHR systems in health facilities in Kisii County shows low adoption patterns in implementation. Despite the benefits of using CHR in healthcare practices, the adoption rate of such systems is still low and they meet resistance from healthcare providers. In considering the factors identified in the study, it should be possible to improve the capacity of health care professionals to effectively use the CHR systems with ease. Computerized health records use requires the presence of certain users and system attributes, support and numerous organizational and environment facilitators.



## **5.5 Recommendations**

Based on the findings, this study recommends that vendors should look at the factors that are influencing adoption of their systems. Reliability refers to the dependability of the technology systems that comprise the CHR. They should also offer sustainable after-sale service to the health care practitioners.

Secondly, medical training institutions should adapt to the use of CHRs in training their students. Training medical students to use computer aided programs as their decision support tools can only serve to accelerate the CHR adoption. This will also give them confidence to use the technology once they join the practicing field. Finally The Ministry of Public Health should come up with standardization of the development of the CHR systems so that they can easily be integrated with each other and friendly to use.

### **5.5: Suggestions for further research**

On the basis of what has been found out from this study, the researcher makes the following suggestion for further research;

1. A detailed study be undertaken to establish if the number of years of operation of the healthcare facility has an influence on the adoption of CHRs.
2. The same study can be conducted in neighbouring Counties to assess the challenges faced by medical practioners in implementing CHRs in those Counties.

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## **APPENDICES**

### **APPENDIX I**

#### **LETTER OF TRANSMITTAL**

**BRIAN OYUGI O. RAMBEKA**

P. O. BOX 2587- 40200

KISII

Tel: 0717356760

Dear Respondent,

#### **RE: REQUEST TO FILL THE QUESTIONNAIRE FOR RESEARCH PURPOSE**

I am a postgraduate student at the University of Nairobi and I request you kindly to fill the attached questionnaire as sincerely as possible. The research topic focuses to investigate the factors influencing the adoption of computerized health record systems in Kisii County. This study is purely for academic purposes and NOT for any other purpose. Your views will be crucial to the success of this study. Your cooperation will highly be appreciated and any information given shall be treated as strictly private and confidential.

Yours sincerely

**BRIAN OYUGI O. RAMBEKA**

## **APPENDIX II**

### **QUESTIONNAIRE FOR HEALTH CARE PROFESSIONALS**

This questionnaire is designed to help explore some of the issues associated with the factors influencing adoption of computerized health records in Kisii County. Your cooperation in completing this would be much appreciated. Responses will be anonymous and no comments will be attributable to individuals. Please note that your participation in this study will be voluntary.

**N/B: Please tick most appropriate responses**

#### **SECTION A: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS**

1. State your age (In years)?
  - a) 20 and below
  - b) 20-30
  - c) 30-40
  - d) 40-50
  - e) 50 and above
2. Indicate your Gender?
  - a) Male
  - b) Female
3. State your marital status?
  - a) Single
  - b) Married
  - c) Divorced
  - d) Widowed
  - e) Other (specify).....
4. For how long have you been serving in the facility?
  - a) One year and below
  - b) 1 – 3
  - c) 4 – 7
  - d) 8 – 11
  - e) Above 11



5. Indicate your area of operation in the facility?
  - a) Clerical
  - b) Clinical
  - c) Administrative
  - d) Management
  - e) Other (specify).....
6. State your level of education?
  - a) Primary and below
  - b) Secondary
  - c) Tertiary
  - d) University
  - e) Other (Specify).....

**SECTION B: STUDY OBJECTIVES**

7. To what extent do you agree or disagree that your facility's CHRs meet confidentiality thresholds?
  - a) Strongly agree     [ ]
  - b) Agree             [ ]
  - c) Neutral           [ ]
  - d) Disagree          [ ]
  - e) Strongly disagree [ ]
8. How would you describe access to the facilities CHRs?
  - a) Very easily        [ ]
  - b) Easily             [ ]
  - c) Indifferent       [ ]
  - d) Difficult          [ ]
  - e) Other (specify).....
9. Indicate mechanism for systems protection?
  - a) Presence of systems analyst           [ ]
  - b) Administration of firewalls           [ ]
  - c) Safety of gadgets                       [ ]
  - d) Authorization passwords               [ ]
  - e) Other (specify).....

10. What backup provisions do you put in place?
- a) File systems
  - b) Data base
  - c) Hard disks
  - d) Hard copies
  - e) Other (specify).....
11. When asked to rate availability of ICT infrastructure in your organization on a scale of 1 - 5, how would you respond?
- a) 1
  - b) 2
  - c) 3
  - d) 4
  - e) 5
12. To what extent does your facility find affordability of the CHRs?
- a) Very affordable
  - b) Affordable
  - c) Less affordable
  - d) Expensive
  - e) Other (specify).....
13. Indicate the most common CHRs infrastructure in your facility?
- a) Computers
  - b) Computer labs
  - c) Networked systems
  - d) Website
  - e) Other (specify).....
14. Indicate the CHRs supporting facilities commonly find in your facility?
- a) Electricity
  - b) Solar system
  - c) Power generators
  - d) Wet cells
  - e) Other (specify).....

15. In your opinion, explain how availability of infrastructure influences adoption of CHRs in your facility?

.....  
.....

16. Indicate your highest professional training?

- a) Certificate and below
- b) Diploma
- c) Degree
- d) Post Graduate
- e) Other (specify).....

17. State your area of training?

- a) Business management
- b) Clerical
- c) ICT
- d) Medical
- e) Other (specify).....

18. What nature of training do you embrace?

- a) Formally
- b) Informally
- c) Experience
- d) Workshops and seminars
- e) Other (specify).....

19. State how often you train to keep up with changes in technology?

- a) Very frequently
- b) Frequently
- c) Occasionally
- d) Hardly
- e) Other (specify).....

20. In your opinion, explain how training influences adoption of CHRs in your facility?

.....  
.....

21. To what extent do you agree or disagree that your facility is adequately financed?

- a) Strongly agree [ ]
- b) Agree [ ]
- c) Neutral [ ]
- d) Disagree [ ]
- e) Strongly disagree [ ]

22. Indicate the common sources of funding for CHRs in your facility?

- a) Facilities budget [ ]
- b) Sponsors [ ]
- c) Government grants [ ]
- d) Commercial loans [ ]
- e) Other (specify).....

23. Describe the different levels of funding in your facility?

- a) Initial acquisition [ ]
- b) Installation [ ]
- c) Maintenance [ ]
- d) Systems review [ ]
- e) Other (specify).....

24. State the frequency of funding for your facility?

- a) Monthly [ ]
- b) Semi annually [ ]
- c) Annually [ ]
- d) Bi annually [ ]
- e) Other (specify).....

25. In your opinion, explain how funding influences adoption of CHRs in your facility?

.....  
.....

26. How would you rate the presence of ICT infrastructure in your facility on a scale of 1 – 5?

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

27. To what extent does your facility use CHRs in recording health issues?

- a) Very frequently
- b) Frequently
- c) Occasionally
- d) Hardly
- e) Other (specify).....

28. How often do you analyse patient data in your facility?

- a) Very often
- b) Often
- c) Indifferent
- d) Hardly
- e) Other (specify).....

29. To what extent has your facility put in place policy guidelines on the usage of CHRs?

- a) Very high
- b) High
- c) Moderate
- d) Low
- e) Other (specify).....