HEALTH MANAGEMENT INFORMATION SYSTEMS CAPABILITY AND PERFORMANCE OF PUBLIC HOSPITALS IN GARISSA COUNTY, KENYA

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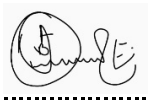
D53/OL/GAR/32247/2017

A RESEARCH PROJECT SUMITTED TO THE SCHOOL OF BUSINESS IN PARTIAL FULFILLMENT FOR THE AWARD OF MASTER OF BUSINESS ADMINISTRATION (MANAGEMENT INFORMATION SYSTEM) OF KENYATTA UNIVERSITY

NOVEMBER, 2022

DECLARATION

The project is my original work and has not been presented to any other university for examination purposes. No part of this document shall be reproduced without my authority or that of Kenyatta University.

Signature…  **……..... Date ……**05/11/2022**……**

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The project is submitted for examination purposes with my approval as his appointed supervisor.

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DEDICATION

My father, Dagane Hassan, my sister, Ebla Dagane, and my brother, Suleiman Dagane, I dedicate this project to you.

ACKNOWLEDGEMENT

I acknowledge the advice and support given to me by my supervisor Dr. Joshua Tumuti. May God bless you abundantly. In addition, I acknowledge the guidance from Dr. Josphat Kyalo for his unwavering support in handling the correction suggested by the Kenyatta University defence panel. Further, I thank my colleagues in Kenyatta university year 2017 and the library staff in Kenyatta University for their support in getting information related to my research topics. I appreciate the support from family members Ahmed and Bashir for their financial support.

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ABBREVIATION AND ACRONYMS

HIT	Health Information Technology
HIMS	Health Information Management Systems
ICT	Information Technology
IT	Information Technology
MDG	Millennium Development Goals
NACOSTI	National Commision for Science, Technology and Innovation
RHWs	Reproductive Health Workers
SPSS	Statistical Package of Social Sciences
TAM	Technology Acceptance Model
UNDP	United Nations Development Programme
USA	United States of America
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Data Storage: It refers to all of the methods and technologies that are used to capture and store digital data on electromagnetic, optical, or silicon-based storage media. Consumers and organizations have grown to rely on storage as a major component of digital devices to preserve information ranging from personal images to business-critical information.

Information Security A facility that guarantees secure patient experiences, early detection of fraud, error monitoring, and successful care, diagnosis, investigation, test results and prescription medication.

Service Delivery Provision of time and required medical services in the public hospitals in Kenya.

Information Integration This includes the integration methods, communication systems and tracking of medical reports

Health Information Management Systems Capability: Health information technology element, focusing primarily on hospital administration needs.

Performance of Hospitals: This indicates the output of the hospital as per the expectations of the citizens and patients. The indicators of performance of hospitals were average hospital stay, bed occupancy rate, treatment costs and patient room turnover rate

ABSTRACT

Public hospitals in Garissa are unable to track results related to hospital facilities and disease statistics and these has adversely affected speed, efficiency and utilization of hospital resources. The public hospital costs are too huge, the fees collected are too small and that the public hospitals are heavily dependent on the government. The support provided by the government by allocating funding and using the required equipment has not been reflected in the timely, convenient services provided by electronic data bases to patients, administrators and doctors. Therefore, this study aimed to establish the effect of health information system capability on performance of public Hospitals in the Garissa County, Kenya**.** The study's specific objectives were to establish the influence of data storage, information security, information integration and service delivery on performance of Public Hospitals in Garissa County, Kenya. The study was anchored on technology acceptance model, theory of change and innovation diffusion theory and resource based view theory. Descriptive research design was used. The target population was 2 public hospitals; Garissa provincial general hospital and Garissa county hospital with a total population of 1403 employees. The study's respondents were 62 information technology specialists working in the two hospitals. Due to a small number, the study was a census. Questionnaires were used to gather primary data. The process of drop and pick later was used. Descriptive and inferential statistics was used to analyze quantitative data. Qualitative data was analysed through the use of content analysis. Respondents were notified before data collection and were allowed to participate voluntarily. The study results indicates that the hospital does not keep electronic health records and patient's records were not managed electronically. The application of healthcare medical storage technology was ineffective, making the procedure of handling a patient tiresome. It is obvious that the public hospitals in Garissa County have not established a standard for the permissible use of the hospital's information technology, including networks and apps, to ensure data security, integrity, and availability. The integrated health services were not built on a firm foundation of primary care and public health functions. Integration of information is critical for improving operations and the quality of hospital services. Patients in Garissa County were not satisfied with the standard of medical services they receive due to increased waiting hours, cost of movement in search for healthcare services, availability and accessibility of health services and poor patient vs doctor ratio. The study concludes that data management and storage has been made much easier by HMIS. However, Public hospitals in Garissa are poorly electronically managing their data and providing medical services in the vast county is a challenge. Patients records poorly stored and there no back up just in case an emergency happens. Error detection can also be concluded to be much easier when the system are in use but in case of Garissa, detection is not easy due to poor storage, poor information security and poor information integration. The management should ensure that the hospitals fully benefit from the HMIS. The operations in the public hospitals should be 100Percent supported by the health management information system. The system providers should be advised that there is a need to distribute health management information systems sufficiently in all public hospitals in Garissa County.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Since the 1960s, hospital information management systems have advanced. In the 1980s, they wanted to combine various components in an integrated approach, while in the 1970s, they wanted to cut expenses (Booth, 2013). Accordingly, a system is maintained with all patient information. Accordingly. By rapidly accessing the patient details, clinicians may diagnose patients with accuracy. This circumstance benefits in terms of time and money by avoiding pointless medical tests. The use of computerized patient records was very common in the 1990s. After the 2000s, the objective was to enhance the standard of patient care in the healthcare industry using technological applications (Lightbody, 2019). These institutions in healthcare face many obstacles, including limited resources and income generation opportunities but facing ever growing agenda-based activities that require funding to be invested. It is evidenced in the complexity theory that unpredictable action or complex functions can be derived from simple deterministic functions.

The public hospital efficiency is determined by five factors, according to Chien, (2004); the culture of organization, human resource policy, leadership style and climate, the nature of jobs and motif model. Organizational results are determined by the business model, the market, the quality of capital and the role of the company in relation to its competitors. Public health is critical to health care in the 21st century and shares overall objectives such as premature mortality, illness and disability reduction and accident minimis (the World Health Organization (WHO) 2003). MDG 5, in reality, aimed at achieving universal maternal health by 2015 by 2015. (Booth, 2014). Public health aims

primarily at promoting a healthy community. This is absolutely vital to a sustainable health care system and, due to improved efficiency, also offers economic and social benefits to the country.

Information management systems in hospitals Healthcare is an essential part of every developed country's economy. In rural areas, healthcare provides employment opportunities, especially for people with high-skilled jobs. Public spending in the United States accounted for almost half of all health spending in 2009, while other countries such as Switzerland, Norway, and the United Kingdom pay for 60Percent, 60Percent, and 84 percent, respectively. Norway has a $4501 per capita budget and spends more on public health than the United States of America, which spends $3,795 per capita. In terms of per capita health spending, the United States of America outspent countries like New Zealand, Australia, the United Kingdom, Sweden, and even Japan. According to Whetten (2014), health services in Scotland, Wales, England, and Northern Ireland were all provided by UK taxpayers until 1999, but since then, new policies and government structures have been implemented.

In certain parts of Africa, inadequate information systems have hampered the expansion and development of health care delivery. Despite accounting for just 11Percent of the global population, Sub-Saharan Africa has the highest disease burden (24Percent) in the world (international finance corporation, 2017). The fact that the region accounts for less than 1Percent of global spending on health and information system growth is troubling. According to Young (2010), public sector support for management information systems in health care remains inadequate on the African continent.

Schindler (2011) says that several African states signed the Abuja declaration promising to redirect 15Percent of their national budget to support, but according to current figures, the majority of the nations have only decreased their healthcare expenditure by seven in recent years. At present, over nearly half the health care costs on the continent of Africa are covered with a typical ratio that is almost 90Percent higher in some countries in Africa, with many people unable to get any substantial treatment driving the costs down to low because people are unable to pay (Young, 2010). This supports the principle of diffusion that inventions are transmitted over time and within a certain social system through certain networks. Persons are seen to be able to embrace innovations at various levels. Hence, it is commonly found that the portion of people who adopt innovation is spread over time roughly.

Kenya's health sector is extremely weak because it relies heavily on pocket payments (Okungu, 2011). Chuma (2011) indicates that government funding is used only with the historical increase. The healthcare industry in Kenya is underfunded and leads to inadequate information management systems in hospitals. The coordination, record keeping, input and treatment of patients in the Kenyan healthcare sector is worrying, and the provision of healthcare in Kenya poses enormous risks. The country has made little progress in achieving international criteria, including the Abuja target of the government budget of 15 per cent. Tumor and Ukungu 2011 maintained that Kenya's healthcare system is handled in a thorough manner, not to promote justice and to ensure a fair distribution of health-related knowledge and services, nor a lack of policy that addresses the needs of the venerable poor and the vulnerable in society. However, the government's universal coverage of healthcare does solve some of the issues, but the Government also has a systemic approach to funding for health care (Chuma & Okungu, 2011).

The first step towards improved health sector efficiency is using health management Information Systems in public hospitals (UNDP, 2011). Progress in the quantification phase, which stimulates a positive outcome. The way people live, read, work and communicate has been revolutionized by information and communication technology (IT) (Okinawa, 2010). The world has become a worldwide settlement with the web, cell phones and satellite networks shrinking time and space, putting together computers and communications, which lead to new ways in which information is transmitted, processed, stored and distributed. In a dynamic environment, it enhances effectiveness, precision, immediate information transmission, increases quantity, improves quality and accelerates information availability (Okorie, 2010). The development agenda of countries has progressed more quickly, although companies increased production more rapidly than previously. In any operative task of an organisation, IT has streamlined processes (Ochieng, 2012).

1.1.1 Performance of Public Hospitals in Garissa County

The performance of the public hospital depends on clinical or administrative roles or the set goal (Flint, 2010). The main objective of all health care services is to improve the health of the majority of patients, but there are numerous intermediate steps, results and procedures. The aim of this healthcare could be conventional functions including treatment, diagnosis, recovery, and study and teaching in hospitals. Many hospitals are undergoing transformations, with a focus moving away from inpatient treatment and toward ambulatory care, healthcare networks, and community outreach initiatives (Swanson *et al.,* 2010).

Hospitals' functions are also likely to include aspects of public and community care, as well as jobs and social needs. Garissa County hospitals have faced a variety of management and performance issues, ranging from budgeting to facility expansion (Manyani, 2011). The availability of services and medical service delivery to the County would be used to gauge hospital performance. The county requires a total of 707 Nutrition workers, according to the Garissa Human Resources for Health Management and Development strategy (136 officers, 353 technologists and 218 technicians). However, just 33 nutritionists are available, leaving a 674-person shortage.

However, according to the Garissa Human Resources for Health Management and Development plan, only 17Percent of the HRH criteria are expected to be met. Human Resources are a valuable resource for health management and development. Despite the fact that no new employees were hired in the 2012/2013 fiscal year, 17 employees were hired in the 2015/2016 fiscal year and 14 in the 2016/2017 fiscal year. There hasn't been any new recruitment since then. Nutritionists are widely dispersed throughout the various levels. The CNC claims that the distribution was based on the workload at various levels.

As a means of enhancing the health of its citizens, Garissa County has invested in a community health strategy. As a result of the assessment, overall health performance metrics such as average hospital stay, bed occupancy rate, treatment expenses, and patient room turnover rate, as well as community health seeking behaviors, have improved slightly. The number of community units that have been formed and are operational is significantly less than the recommended total of 177 CUs (MOH, Garissa County, Capacity Assessment, 2019). Most of the public health workers are concentrated

in one or two facilities or locations, with the remainder of the health facilities largely lacking health worker (Health Sector Performance Report, 2019).

1.1.2 Health Management Information System in Public Hospitals

Health information management systems include a network of institutions consisting of various information on the medical, financial and management functions of a hospital (Abraham & Junglas, 2011). The initial uses of these systems are limited to patient information recording and billing. New modules such as appointment over the Phone, follow-up patients, analytical requests and view results have also been applied to patient information systems. Thus, doctors have been able to send their applications via automation systems to laboratories directly and track results online (Mansar, 2016).

Worldwide, the development of health information technology enhances the effectiveness of health care services, reduces medical errors, improves the quality of care and provides patients and physicians with better information (Pollak & Lorch, 2012) The general aim of the information management feature is for information to be obtained, managed and used to enhance health and health outcomes, efficiency, governance and management and support processes. In managing costs for health care and improving care quality, IS has plenty to say (Kolodner, 2015). Furthermore, Piontek (2016) notes that the quality of life and work of society is determined by health care. Health errors have significant repercussions that can impact social and productive activities. Recent studies show the seriousness of negative incidents in hospitals and the risks to individuals and the public posed by these events. In the last decade and the last few years, health information systems have radically changed the healthcare industry (Abraham & Junglas, 2011).

Competitive pressures and developments in healthcare technology drive hospitals to meet the trend (Kolodner, 2015). Paperless health systems are inevitable and any health institutions not following this pattern are behind the remainder of the industry (Abraham & Junglas, 2011). The health information system is a must and the more accurate it is, the faster it is enforced (Swanson et al., 2010). One of the most quoted models of IT services, Delone and Mclean (2013) aims at providing a thorough understanding of successful information system systems through the identification, definition and explanation of the connections between six categories of performance variables: system quality, quality of information, user content, personal effect, and organizational impact. The Delone and Mclean (2003) model offers systematic framework work to measure information system service delivery and to improve the understanding of the performance of information systems.

Despite large resources and time spent developing and implementing health information systems, health data are scarcely being used for planning and decision-making in service delivery by health workers (Abraham & Junglas, 2011). The overall culture of information generation and usage remains underdeveloped and processes for validation and reliability have not been optimally functional. The results are largely indicated by information management lag behind other industries (Pollak & Lorch, 2012).

1.2 Statement of the Problem

Due to a lack of adequate health management information systems, public hospital clinicians in Garissa County are having difficulties sending requests directly to labs, scheduling appointments online, requesting research, monitoring, and showing results despite government help. The public hospitals in Garissa are unable to track outcomes

connected to hospital facilities and disease data as a result, which has a negative impact on hospital resource consumption, utilization rates, and speed. The government is significantly dependent on public hospitals due to their high costs, little revenue, and dependence on the government (County Government of Garissa, 2019). The government's support, expressed in the allocation of funds and the provision of relevant facilities, has not translated into timely and convenient services for patients, administrators, and physicians through an electronic database.

Shekelle *et al.,* (2016) also carried out research involving a comprehensive assessment of data about the costs and benefits of HIT programs in the United States. The study showed that health information technology can change medical care dramatically and make it safer, accessible and more efficient. The study shows a contextual gap as the links have not been seen between the sanitary information system and the provision of services in public hospitals. In a report by HIMSS Analytics (2018) on health information security, the healthcare sector is experiencing a continuing increase in data security violations in health care organizations and a drastic rise in the number of threats to this region. The study used qualitative data and therefore methodological knowledge gap was evident. The current study will use both qualitative and quantitative data.

There is poor data storage, information security, information integration and service delivery which have affected performance of public hospitals interms of the costs of services, patient satisfaction and infrastructure growth. In addition, the extent to which the health information system has been applied and the extent to which this has improved performance of public hospitals is still not clear. This study aimed to determine the effect of health management information system capability on performance of public hospitals in Garissa County, Kenya.

1.3 Objectives of Study

1.3.1 General Objectives

The aim of this study was to investigate the influence of Health Management Information System capability on performance of public hospitals in Garissa County, Kenya.

1.3.2 Specific Objectives

i. To establish the influence of data storage on the performance of public hospitals in Garissa County, Kenya.
ii. To examine effect of information security on the performance of public hospitals in Garissa County, Kenya.
iii. To establish the influence of information integration on the performance of public hospitals in Garissa County, Kenya.
iv. To determine effect of service delivery on the performance of public hospitals in Garissa County, Kenya.

1.4 Research Questions

The research questions of the study were**;**

i. What are the effect of data storage on the public hospital's performance in Garissa County, Kenya?
ii. How does information security affect public hospital's performance in Garissa County, Kenya?
iii. How does information integration influence the public hospital's performance in Garissa County, Kenya?
iv. What are the effect of services delivery on the public hopital's performance in Garissa County, Kenya?

1.5 Significance of the Study

The production and use of high-quality health data and knowledge is critical at all levels of the health system. This study establishes a foundation for evaluating HIMS in the public sector, allowing for the identification of the system's strengths and flaws in order to improve the health system's overall performance. This study lays the groundwork for future research on evidence-based health-care administration in general, as well as specific insights into enhancing and improving healthcare facilities around the world.

The study's findings and recommendations will assist the Minister of Health in developing a stronger health management system that will assist health care personnel and facilities in identifying their weaknesses and suggesting better ways to increase their efficiency through better use of expertise. The findings of the study will be used by both health care professionals and managers, who will no longer rely on haphazard personal perceptions, arbitrary personal judgments, or advice from friends or family, but rather on objective facts, allowing them to reinvent themselves as problem solvers.

1.6 Scope of Study

With a total size of 44,175,5 kilometers, Garissa County is located in Kenya's old North Eastern province. It is bordered on the north by the county of Wajir, on the west by the county of Tana River, on the north by the county of Isiolo, on the south by the county of Lamu, and on the east by the Republic of Federal Somalia. The goal of this study was to see how health management information systems capacity affected service delivery in Kenya's public hospitals in Garissa County. The study was place in Garissa County, Kenya. The study's main purpose was to see how data storage, information security, data integration, and service delivery affected public hospital performance in Garissa County,

Kenya. A descriptive research design was used in this study. From 2015 until 2020, there was an interest period.

1.7 Limitations of Study

Due to the confidentiality of the information, some respondents were reluctant to provide data. However, the respondents were given the assurance that the data collected would only be used for educational purposes. The researcher first got consent from hospital administration to gather data from the two public hospitals in Garissa County, Kenya.

1.8 Organization of the Study

The organization of the study is divided into five chapters, with the first covering the introduction and background of HMIS as well as service delivery in County public hospitals. The literature review of the variables considered in the study is done in chapter two. The comparison of other studies relating to HMIS and results, the research gaps, and finally the conceptual structure is covered in Chapter 2. The methodology used in the study was discussed in the third chapter. The chapter four in this study contains findings, interpretations and discussion relating to the study variables. Chapter five presents the study summary, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The theoretical context and empirical analysis for the study subject of health management information systems and service delivery in public hospitals are presented in this chapter. The chapter also presents the gap presented by the reviewed studies and how the current study filled them. The chapter culminates by presented the variables and their indicators in a conceptual framewok.

2.2 Theoretical Review

The study variables were supported by technology acceptance model, theory of change and innovation diffusion theory and resource based view theory.

2.2.1 Technology Acceptance Model

Davis developed the Technology Acceptance Model (TAM) in 1986, and it is one of the most well-known frameworks for technology clearance and utilization. TAM has proven to be a theoretical model for describing and predicting customer behavior in the information technology sector (Yoon, 2016). The Idea of Reasoned Action (TAM) is a significant development of the theory of reasoned action (TRA). TAM was recommended by Ashraf, Narongsak (Tek), and Seigyoung (2014) were able to identify whether a client accepts or rejects information technology by acclimating to TRA. TAM is used to determine how external circumstances influence the idea, sentiments, and target that will be utilised. TAM recommends two cognitive principles. These characteristics can be seen in terms of utility and simplicity of usage (Holden *et al.,* 2016).

According to Mortenson and Vidgen, an individual's real usage of a TAM technology system depends on their behavior, style of thinking, apparent system usability, and apparent system convenience (2016). Additionally, TAM contends that external factors affect how useful and simple media impacts seem to be. Using this paradigm, the study will describe how information systems are used in Kenyan public hospitals. It will therefore give a theoretical understanding of how ICT may boost data storage, information security, and information integration to increase efficiency in public hospitals. TAM supports data storage variable, information security variable and information integration

2.2.2 Innovation Diffusion Theory

Rogers (1995) developed Innovation Diffusion Theory. Expectations of innovation qualities, adopter traits, and contextual factors are the three key aspects that determine the acceptance and diffusion of an invention, according to this hypothesis. According to the notion, innovations are passed down through specific networks over time and within a particular social structure. People are believed to have varying levels of motivation to adopt innovations, therefore the proportion of the population that does so is typically found to be roughly naturally distributed across time. Individuals are split into five groups based on their individual innovativeness (from earliest to latest adopters) as this standard distribution is subdivided: innovators, early adopters, early majority, late majority, and laggards (Wejnert, 2001). The mechanism of creation is far more complex with enterprises. It often consists of a group of individuals who all contribute to the process, maybe including both proponents and detractors of the novel idea.

Five criteria were outlined by Rogers (1995) for assessing inventions. The elements to take into account include relative benefit, compatibility, sophistication, triability, and

observability. Relative advantage is the degree to which an invention is thought to be superior to the method it replaces. The terms economic, social, and other benefits are frequently used to describe relative advantage. A prospective adopter's impression of an invention's fit with their current beliefs and behaviors is referred to as compatibility. A new practice becomes less ambiguous, more prevalent, and simpler to implement when it is compatible with what already exists. The complexity of an invention is defined as the degree to which it is difficult to comprehend and use. The adoption rate of an invention is poor if future adopters find it to be complex. The degree to which an invention can be subjected to minimal testing is referred to as triability. Finally, observability refers to how clear the outcomes of an innovation are to others.

This idea has been used to study how various information technology systems have been adopted in the healthcare industry. However, it does not go into detail on how to assess the effectiveness of innovation. Gagnon claims that this theory has also been criticized for not being explicit enough (2010). This hypothesis postulates that innovation spreads across time and among people, leading to several adopter types. According to Rogers, the function of knowledge in the dissemination process, which reduces ambiguity, is responsible for this adoption distribution. As a result, this principle encourages the use of HMIS to integrate service capabilities. This theory supports information integration and information security variables in the study.

2.2.3 Change Theory

Kurt Lewin developed change theory in 1991. It focuses on the unfreeze, transfer, and freeze processes and offers a higher-level perspective on the transition process. A manager or other change agents may use this concept to build a framework for implementing change efforts that is both responsive and smooth. It consists of three steps:

introducing a drastic change, minimizing disruption to the operations system, and ensuring long-term implementation of the change.

To guarantee that the transformation of health care to the lowest practical level is completely enforced, operational, and practicable for the public good, a number of changing stakeholders should adhere to the philosophy of change. According to Leach et al., most managers will be able to communicate this to their team members in terms of management changes, HMIS implementation, regular training, and streamlining the procurement process if they have a solid understanding of the change mechanism. Changes will encounter resistance because of the original structured structure (2016).

Habit/s and routines have naturally been developed in places that have frameworks (Holden *et al.,* 2016). Individuals within an organization can work in the right direction as far as the organisation. Unfreezing is clearly a way to get people to realize their dawn, refuse their unwanted behaviors and be able to achieve their goals in new ways. It sets in motion the rolls of transformation. Change can then begin with open minds. The method is highly complex and time-consuming, including a transition phase, for effectiveness. People take new tasks and tasks to make them effective, but they need to be progressive and often slow down until they are able to stay. Refrosting will then achieve the maximum desired effect by permanent transition. If the transition is cemented, the new company becomes normal and every effort must be taken to ensure success (Orr& Davenport, 2015).

The reorganization and decision-making processes, as well as the forces' equilibrium between driving and reinforcing forces, are all examined through Lewin's strength field analysis. The study examines who controls policymaking, where influence is

concentrated, and how opposing viewpoints can be persuaded (Orr & Davenport, 2015). Resistors (restraint) at a firm are pro-status, whilst driving forces (improvement) look for methods to improve. The objective is to achieve balance. This theory is significant for the study because it offers guidance on how to better adopt and handle technological innovation in healthcare institutions in order to provide high-quality healthcare. It also seems to understand management and young employee relations in disagreement and conflict resolution.

This also identifies the elements that contribute to labor unrest at these hospitals, which seldom reach an agreement, as well as how they might be better understood. Finally, the theory assists scholars in better understanding how changes are executed and how management handles difficulties through systems (Leach, 2016). Our idea is especially pertinent to this study since it encourages the adoption of IT systems for data storage, which has an impact on how public hospitals operate.

2.2.4 Resource Based Review Theory

The Resource Based Theory, put forth by Wernerfelt (1984) and developed by Barney (1991), will also be used in the study. According to this theory, an institution's resources comprise, among other things, assets, capacities, activities, institution qualities, information or data, and awareness. The theory was applied by Robert M. Grant (2001) in an effort to define resource mobilization strategies for development. This theory states that "strategy" is an evaluation of a company's internal revenues and capabilities in relation to the opportunities and risks presented by its external environment. County governments can be seen as an organization with a revenue base that should be properly and efficiently exploited to appreciate the growth of IT resources in the framework of the

current study. The Resource-Based (RB) Theory, on the other hand, can be thought of as a "inside-out" approach or process.

The idea focuses on developing a plan for mobilizing resources, such as ICT resources. According to the theory, the ability of a firm's revenues and competencies to provide a sustainable competitive advantage is critical to the strategic planning process' timeline. This means that in order to recognize development, county governments should establish appropriate performance metrics in their public hospitals. The idea goes on to say that the most profitable strategies are those that reduce costs while increasing production and efficacy. According to Grant (2001), building policy around the most analytically essential incomes and abilities restricts a firm's strategic range to those endeavors where it maintains a perfect competitive advantage. This means that counties should recognize and spend more in more profitable revenues in order to get a competitive advantage. Thus, this theory clearly supports the four independent variables and the performance of public hospitals through the utilization of health management information system capability.

2.3 Empirical Review

This section presents reviewed studies on data storage, information security, information integration and service delivery and how they affect the performance of Garissa public hospitals.

2.3.1 Data Storage and Performance of Public Hospitals

In Nairobi County, Kenya, Orang'i, Ogalo, and Wasike (2019) investigated the impact of healthcare information systems on service delivery in private hospitals. To achieve the aims, a descriptive study design technique was used, with the survey method being performed on the target population. The findings of the survey found that data storage is utilized in hospitals, and interoperability policies are in place, but that much more is

needed. The usage of healthcare medical technology is extensively used, and this has sped up the process while also allowing for easier patient monitoring. The research was carried out at private hospitals. The current investigation took place in public hospitals.

Verbeke *et al.,* (2016) have examined the degree to which information and communications technology (ICT) methods can help to increase the quality and efficacy of health services in sub-Saharan hospitals and the availability to secondary use of clinical information that can allow non-redundant reporting of measures of health and care results. Data were collected between 2006 and 2012 for a six-year research effort. It was demonstrated that, following the introduction of well adapted ICT tools in a collection of 19 African health facilities, patient recognition, financial management and formal reporting improved dramatically. Metrics for financial reporting in real-time also helped hospitals detect deceptive practices and invoicing procedures quickly. The number of outpatient cases rose dramatically relative to the national average, the average duration of stay was reduced in 15 of 19 health facilities, and global hospital mortality decreased. The effect of the hospital information system implementation on local working conditions and care quality, as assessed by the hospital workforce, was very positive. The study fills a gap in the background since it focuses on health care facilities in Sub-Saharan Africa.

The use of information technology in developing countries has been examined by Bukachi and Pakenham-Walsh (2017). Poverty has aggravated the health-care delivery crisis in developing countries, especially in Sub-Saharan Africa, which has the world's highest disease burden, according to the report. The findings revealed that Internet connectivity and data storage in urban areas has increased significantly over the last decade, with health-care staff now using it for networking, access to specific health-care information, and international collaboration. The most important takeaway from this time

regarding the use of ICTs is that infrastructure and cultural contexts differ and necessitate different models and approaches. To fully realize the potential of HMISs for the benefit of health systems, health staff, and patients, a complex combination of old and new technology will be needed. The research was conducted in a cross-sectional manner and concentrated on developed countries. The current research concentrated on a descriptive examination of public hospitals.

A study carried out by Idowu (2013) revealed that while the Nigerian education hospitals offered the HMIS capabilities (personal computers, cell phones and the Internet), mobile phones spread fastest. Their findings also showed that although computers and mobile phones were used in data storage in all teaching hospitals, there was limited Internet connectivity, implying that the majority of medical experts relied on external (nonhospital) Internet providers, such as cybercafés, for even basic Internet access, such as email. They also explains that while 1.4Percent of medical personnel did not use the web in any way, the vast majority of Internet users did so for e-mail purposes only. The results have been examined and thus a contextual gap was created in Nigeria in hospitals.

Moreover, Adeyemi and Ayegboyin (2014) reported that none of the institutions had e-mail access or a website, that only 5Percent of workers had computers, that only 7 percent of healthcare workers were computer literative and only 2 percent had a measurable computer system. In addition, the study included four hospitals, 10 primary care centers or 6 private clinics in Nigeria. Despite the fact that Lagos has the largest number of internet, telecom and cybercafés service providers, the aim was to establish a fair forum for HMIS use. The study was based in Nigeria general hospital and did not present inferential analysis results therefore presenting a methodological knowledge gaps.

2.3.2 Information Security and Performance of Public Hospitals

According to a report conducted by HIMSS Analytics (2018) on security in health information systems and service delivery in the United States' health-care industry, The number of data security breaches in health-care organizations has increased significantly, as has the number of threats in this area. Between 2013 and 2017, over 1.5 million names were exposed to data breaches in hospitals alone, according to the study. Internal challenges to the health information system include employee indifference, curiosity, recklessness, inadequate behavior, using someone else's password, and giving the password to other employees, according to the report. Since the analysis relied on secondary data, it has methodological knowledge gaps. Primary data was used in this analysis.

In 2010 over 110 health organizations recorded loss of confidential and secure health information, according to Sedlack and Tejay (2016), carried out on the basis of a safety survey. Personal identifying information has impacted over 5,306,000 individuals since January 2008, with annual damages from patient information losses reaching $6 billion in 2010. The study report detailed theft (stolen computers, phones, or media), negligence or neglect by employees or third parties, malicious insiders, computer hacks, web exposure, and virus attacks. The study was a descriptive research and did not present the relationship between variables. The Current study filled the knowledge gap by presenting the relationship between variables.

Asai and Fernando (2017) on a study on effect of information system security on health care performance. Human factors are responsible for 80Percent of privacy violations,

according to the report, which also confirms that human errors account for a significant portion of privacy breaches in the United States. In addition, a study by Deloitte (2017) found that 91 per cent of participant participants are concerned about safety deficiencies of employees and that 79 per cent of respondents mention human factors as the primary cause of security information. Users of health information systems must be trained and aware about risk assessment biases, as well as the severity and consequences of possible security breaches. The study knowledge was based health care performance but the current study focussed on performance of public hospitals.

2.3.3 Information Integration and Performance of Public Hospitals

The impact of the healthcare infrastructure on healthcare service delivery in Kenya was examined by Qureshi (2013). The study found that quality of HMIS systems was significant factor in determining adoption of HMIS. The study found that ICT mechanisms to ensure efficient identification of diseases should be implemented in the early stages of disease management. The study also indicated that internet connectivity is vital for successful adoption of eHealth. The study did not present the inferential statistics findings and thus the strength and nature of relationship between variables was not clear. The current study presented both descriptive and inferential statistics.

Gatero (2018) investigated the effect of disease management systems on service delivery in Kenyan public hospitals. According to study, doctors may conduct e-searches to access and share health information with colleagues in other parts of the world. However, the study discovered that they are limited in their ability to conduct searches due to a lack of HMIS tools. The study also found that the high cost of computers and a shortage of computers are deterring rural hospitals from adopting eHealth. The study did not present

the inferential statistics findings and thus the strength and nature of relationship between variables was not clear. The current study presented both descriptive and inferential statistics.

Nilsson (2012) conducted research with middle-aged people with severe chronic illnesses and nurses on the use of information and communication technology as a tool for support in home care. The study found that using an HMIS program increased accessibility for people living at home with severe chronic illnesses. The HMIS application also helped nurses save time and make their jobs easier. Direct contact between the ill people and their nurses, which encouraged communication and contributed to less limitations on the ill people's daily lives, seemed to mediate the creation of more trusting relationships, according to the report.

2.3.4 Service Delivery on Performance of Public Hospitals

Olatokun and Adeboyejo (2017) looked into the use of HMISs by reproductive health workers (RHWs), the impact of HMISs on their job functions, and the barriers that prevent HMISs from being fully utilized in Nigeria. A sample of 360 RHWs from the University College Hospital in Nigeria was chosen using a stratified sampling technique. The analytical methods used were frequencies and percentage distributions. RHWs reported using HMISs extensively in their job functions, according to the findings. The main effects of HMIS use on their activities were faster access to relevant medical knowledge, easier information sharing with colleagues, and increased productivity. HMISs were primarily used to access educational, health, and research data. The main obstacles to HMIS use, according to the findings, were erratic power supply and insufficient access to HMIS facilities. The relationship between service integration and service delivery was not discussed, resulting in an information gap that the current study aimed to fill.

In Gatundu North Sub County, Kenya, Cholo, Muhoho and Muchiri (2015) investigated the factors that influence the use of the health-care information system. Both public, private, community-based, and faith-based health facilities in the Sub County used a descriptive cross-sectional design. A total of 134 health professionals in the Sub County were sampled, including physicians, pharmacists, nurses, public health, and other paramedics. A total of 134 health professionals were polled for this study. Data was collected using a questionnaire and an observation checklist. Most respondents indicated that computer shortages are the key reason why medical staff don't use them. The study proposed that HMIS facilities be included in healthcare facilities and that health services should be integrated. Health staff must also be trained in using HMIS to obtain the many advantages of safe and efficient use of HMIS services in the Sub County healthcare system. The findings were based on Questionnaire and an observation checklist while the current study used Questionnaire and an in depth interview schedule.

In their HMIS health system efficiency research in Africa, Mimbi and Bankole (2016): Data from 27 African countries have been analyzed using a multi-method approach. In the study the impact was analyzed using data creation, cluster analysis and partial squares. The results suggest that HMIS and health systems in the 27 countries can be divided into three groups. More compellingly, the findings show that in their health systems countries, too, that have effectively inputs from HMIS. In addition, results show that the integration of HMIS programs greatly increases birth life expectancy and lowers infant mortality. The study suggested that the African countries should invest considerably in HMIS to strengthen their systems of health in order to achieve socio-economic growth. A multi-faceted approach focuses only on the life expectancy and mortality of children and therefore does not explore all aspects of the health management

information system. The current research has theoretically, methodologically, and policy implications.

Kanyua (2015) studied integration of services and adoption of HMIS in public hospitals in Nairobi, Kenya. In the report, 7 public hospitals were tackled using a descriptive research design. The sample consisted of HMIS administrators, record-keepers, employees, cashiers and technicians. The sample size of the analysis was made up of 100 employees. The study found that HMIS integration is one of the issues which adversely influences HMIS deployment in most health facilities. The study also showed that the management of medical equipment requires other important activities that ensure efficient planning and projection of equipment, its procurement and its operation. The study showed that HMIS infrastructure installation is a significant impediment to HMIS adoption. Thus, the HMIS adoption research in Nairobi public hospitals was basically focused on a contextual void. The current study focused on the performance of public hospitals in Garissa County.

2.3.5 Performance of Public Hospitals

Phama and Vub (2019) looked into the influence of several factors on the performance of Vietnam's North Western public hospitals. The information was gathered via a questionnaire that was distributed to 426 people from 42 public hospitals in Vietnam's northwest provinces. The researchers employed correlation regression to examine the influence of various factors on hospital performance. The balanced score card method was used to investigate the influence of non-financial and financial elements on hospital performance. Financial data were the most important aspect determining hospital performance, followed by customer, mission, internal process, training, and staff development, according to the findings. Some significant recommendations were

proposed based on the research findings in order to improve the performance of Vietnam's public hospitals.

Seitio-Kgokgwe, Gauld, Hill, and Barnett (2014) used the World Health Organization's health system performance evaluation framework to examine the performance of Botswana's public hospital system. Document analysis, 54 key informants (N=40) from the Ministry of Health and senior officers from stakeholder organizations (N=14), and surveys of 42 hospital managers and 389 health workers were used to compile the data. Content and theme analysis were used to study data from documents and transcripts, while descriptive data analysis was used to determine proportions and percentages in surveys. The Botswana public hospital system's organizational structure, authority, and decision-making are extremely centralized. Physical access to health services is generally good. However, disparities and inefficiencies are created by issues in the distribution of facilities and inpatient beds. Inadequate resources hinder the hospitals' ability to provide services. There are considerable issues with regard to care quality. While Botswana spent a lot of money to build hospitals all throughout the country, resulting in a lot of physical access to treatments, the hospital system's management and governance, as well as a lack of resources, limit service delivery. Efforts to decentralize hospital management to district-level bodies should be accelerated.

Kakooza, Tusiime, Odoch, and Bagire (2015) studied Ugandan public hospitals' management practices and performance. A cross-sectional survey design was used in this investigation. The target demographic for this study was Ugandan public hospitals. The study's sampling frame included all of the country's 52 public hospitals. A standardized questionnaire with a five-point Likert scale was used to obtain primary data from the respondents. The findings of this study demonstrated that public concerns have not taken

management techniques into account as possible explanations for the hospital phenomenon. Lack of funds, equipment, medications, oversight, political involvement, and proper staffing have all been cited by the local press and people. The configuration of effective use of money, professional management, and competent governing structures are all required for good hospital management.

2.4 Summary of Literature-Review and Research-Gaps

Table 2.1 Summary of Literature Review and Research Gaps

Author	Topic	Findings	Gaps	Gap to be Filled
Phama and Vub (2019)	effects of different factors on the performance of North western public hospitals in Vietnam	Financial data were the most important aspect determining hospital performance, followed by customer, mission, internal business process, learning, and staff development, according to the findings.	Concentrated on Vietnam Hospitals	The study concentrated on performance of public hospitals in Kenya
Gatero, (2018)	effect of disease management system on service delivery in public hospitals in Kenya	Doctors may conduct e-searches, according to studies, in order to access and share knowledge about health with colleagues around the globe.	The study's concept was on disease management on performance	The current study was on Ehealth infrastructure on performance
HIMSS Analytics (2018)	In health-care organizations, data protection is crucial.	Security infringements of data protection in health care have continued to increase, with a substantial increase in the number of threats in this field.	The scope of the study was narrow since it focused on data security in health care	The scope of the study captured the public hospitals in Kenya and their HMIS
Bukachi and Pakenham-Walsh (2017)	Information technology for health in developing countries	The findings showed that Internet connectivity in urban areas grew substantially over the last decade; now it is being used for contact by health care staff, the access to critical information on health care and international collaboration.	The concept of the study was on growth of internet for health in the developing countries	The study investigated on HMIS and their effect on service delivery in public hospitals.
Asai and Fernando (2017)	effect of information system security on health care performance	Human factors are responsible for 80Percent of privacy violations, according to the report, which also	The study was done in United states of America where the information	The current study was carried in Kenya

		confirms that human errors account for a significant portion of privacy breaches in the United States.	system is advanced	
Verbeke(2016)	Contribution of ICT based information management on efficiency and effectiveness of health services	After the introduction of well-adapted ICT resources in 19 African health facilities, the identification, financial management and the formal reporting were significantly improved	The inferential statistics was not presented	The current study presents both descriptive findings and inferential analysis
Sedlack and Tejay (2016)	Security survey of the 2010 Healthcare Information and Management Systems Society	The loss of confidential protected health information has been recorded by more than 110 healthcare organizations.	The focus of the study was on security of the health care information	The current study focused on HMIS in Public Hospitals
Mimbi and Bankole (2016)	HMIS health systems performance in Africa	More compellingly, the findings show that in their health systems countries, too, that have effectively inputs from HMIS. Furthermore, the results show that HMIS integration significantly increases birth life expectancy and decreases infant death rates	The scope of the study was on the Africa HMIS and service delivery in hospitals	The Scope of the current study was narrower since it consider public hospitals in Kenya
Cholo, Muhoho and Muchiri (2015)	Factors that influence the use of the Health Information Management System in Gatundu North Sub County, Kenya	Results show that RHWs have confirmed that they use HMISs extensively in their work functions. The main effects of HMIS use on their activities have been faster access to relevant médical knowledge, easier information sharing and improved performance.	The concentration of the study was on factors affecting the utilization of Health management information system for health care providers which are numerous	The inferential statistics and descriptive analysis was done
Idowu (2013)	Utilization of internet facilities	Their findings also showed that in all teaching hospitals computers and mobiles	The study concentrated on internet connectivity	The current study investigated the effect of ICT

		were in use, but not much Internet access was available	and mobile utilization in public hospitals	infrastructure, integration of services on service delivery in public hospitals.
Qureshi (2013)	In Kenya, the impact of eHealth infrastructure on health-care service delivery is important.	The study discovered that the efficiency of HMIS systems played a significant role in HMIS adoption.	The concept was on the quality of HMIS and adoption of HMIS	The concept under the current study was on HMIS and its effects on service delivery in Public hospitals
Nilsson (2012)	ICT as a mechanism for assistance in home care for middle-aged people with severe chronic illnesses and nurses	People with severe chronic illnesses who live at home benefitted from the use of an HMIS program. The HMIS application also helped nurses save time and make their jobs easier.	The study's methodology was descriptive analysis methods	The current study explored the data after description
Quayle (2012)	Success on HMIS adoption	Reduced administration costs, reduced stock, improved marketing, and improved information quality were among the factors that influenced HMIS identified by small medium enterprise managers, according to the study.	The study focused on success factor on the adoption of HMIS	The current study presented the relationship between HMIS and performance
Olatokun and Adeboyejo (2009)	The use of HMISs by reproductive health workers (RHWs), the impact of HMISs on their job functions, and the obstacles that prevent HMISs from being fully utilized in Nigeria.	Results show that RHWs have confirmed that they use HMISs extensively in their work functions. The main effects of HMIS use on their activities have been faster access to relevant médical knowledge, easier information sharing with colleagues and improved performance.	The study focused on reproductive health wrkers in Nigeria and use of HMIS	The current study focused on public hospital performance determined by HMIS

Source: Researcher (2021)

2.5 Conceptual Framework

The study's independent variable was health management information system which was indicated by data storage, information security, information integration and service delivery. The dependent variable was performance of public hospitals in Garissa County, Kenya. Performance of public hospital proxies included: average hospital stay, treatment costs, patient numbers and patient satisfaction

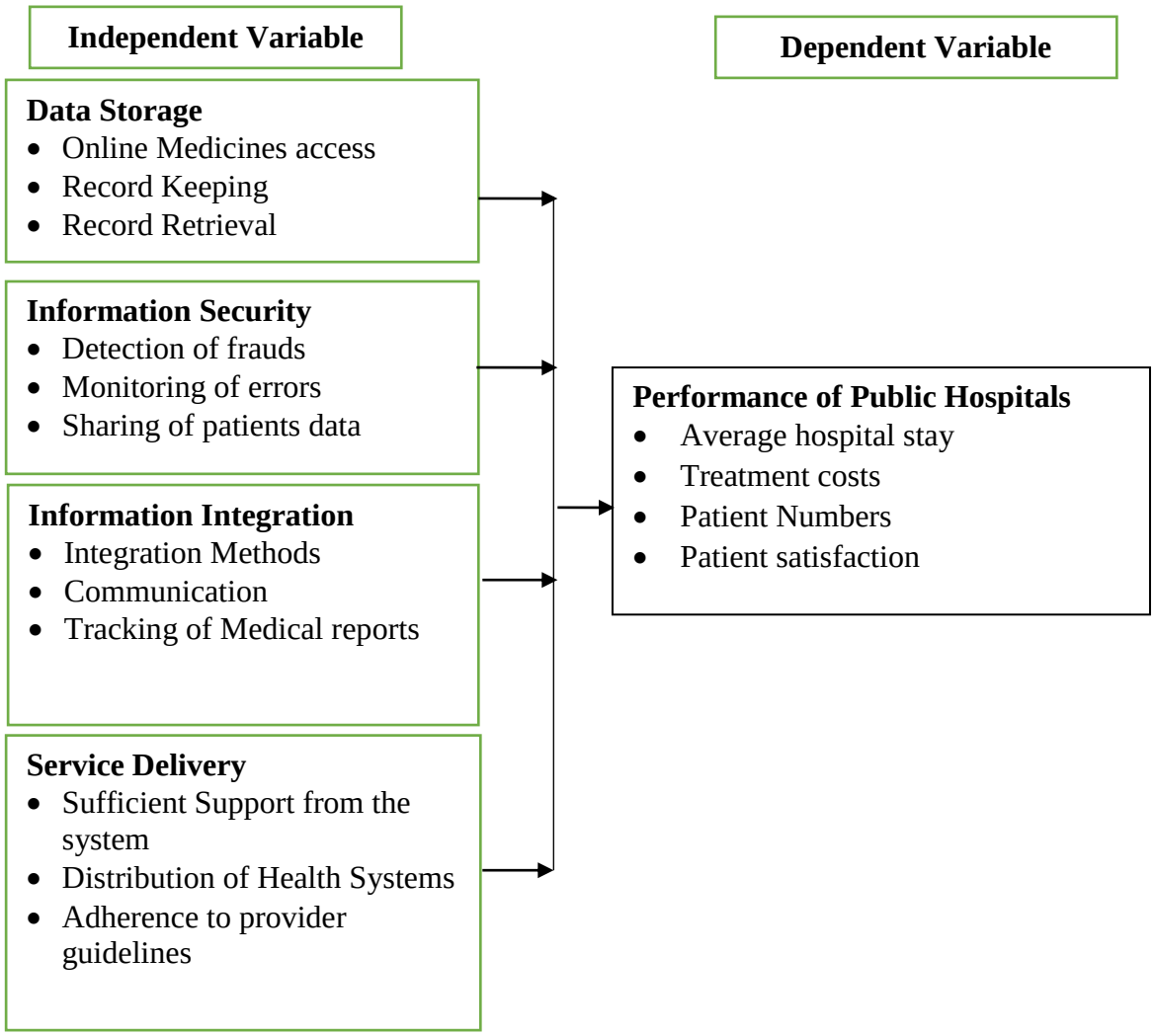


Figure2.1ConceptualFramework

Source:Researcher(2020)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The methods used in the data collection, data testing and analysis and presentation are provided in this chapter.

3.2 Research Design

A descriptive survey research design was adopted in this study, which explained the phenomenon in its natural setting, free of distractions. According to Bryman and Bell, a descriptive survey design sought to collect knowledge that depicts current trends by asking questions about individual views and actions (2011). It entails gathering information about events, then categorizing, tabulating, representing, and explaining the information. The best approach to use for this analysis is descriptive research since the aim was to assess how HMIS affects performance of public hospitals in Garissa County, Kenya.

3.3 Target Population

According to Mugenda & Mugenda (2003) the total group of persons or items under inquiry in any field of study who have a common feature form a population. With a total population of 1403 personnel, the study focused on two public hospitals in Garissa county: Garissa referral general hospital and Garissa County hospital. The study's respondents were 62 information technology specialists working in the two hospitals. The unit of observation included staff in the following categories; 11 network specialists 15 database administrators, 9 programmers and 27 lab technicians.

3.4 Sample Design

Since the target population was IT specialists who were 62 in number, consisting of 11 network specialists 15 database administrators, 9 programmers and 27 lab technicians a census method was used. All the 62 employees participated in answering the questionnaire.

3.5 Data Collection Instruments

This study used primary data. According to Creswell (2005), primary data is information gathered for the first time, while secondary data is information gathered previously and subjected to statistical analysis. The data was collected from the hospital staff through a questionnaire. When respondents are available and ready to answer appropriately, the use of questionnaires would be a popular approach. The questionnaire architecture, according to Cooper and Schindler (2003), states the issue as well as the basic study objectives. The questionnaire for this analysis included both open-ended and closed-ended questions. Respondents were able to share their opinions and perceptions in response to the research questions using open-ended questions. The questionnaire was distributed to the hospital staff through a drop-and-pick method. This option was used when respondents were to fill the questionnaire right away due to a time constraint.

3.5.1 Pilot Testing

Pilot testing entails placing the research questions to the test on a particular sample population with identical characteristics to the one being tested (Kumar, 2005). The researcher used the six (6) workers from the provincial general hospitals in Garissa County to perform pilot testing of the research instruments. The actual data collection process did not include the pilot participants. A pilot analysis of 5 respondents according

to Mugenda and Mugenda (2003) was good for the test. This is essential in the study process because it helps to detect and correct unclear questions and instructions.

3.5.2 Validity of the Instruments

Validity, according to Golafshani (2012), is the accuracy and relevance of inferences drawn from research findings. Material validity would be used in the study, which entails extending test results to a large number of objects that are identical to those on the test. The sample population's representativeness is a challenge for content validity. The test items' knowledge and abilities, according to Gillham (2011), should be representative of the larger area of knowledge and skills. The university supervisors will be requested for their professional opinion on the representativeness and applicability of the questions, as well as suggestions for revisions to the research instruments' form. The validity of both the content and the construct will be tested, and expert opinion will be taken into account.

3.5.3 Reliability of Research Instruments

Reliability addresses the question whether the results of a study can be repeated and similar results obtained (Creswell, 2005). A 0.7 Alpha value or higher construct (Cronbach alpha) composite reliability coefficient is considered sufficient for all the variables in the study (Rousson, Gasser and Seifer, 2012). Therefore Alpha Coefficient of 0.7 was the threshold in determining the reliability level of the research instruments used.

3.6 Data Analysis and Presentation

With the help of SPSS, the data was analyzed using descriptive and inferential statistics. To make data entry in the questionnaire easier, all of the surveys were referenced and coded. All quantitative variables for descriptive data, such as frequencies, proportions, mean score, and standard deviation, were calculated after the data was cleaned up, which included entry error checking, and the information was presented in the form of frequency

tables. Content analysis was used to examine and interpret qualitative data from the open questions. Inferential data was analyzed using multiple regression analysis. To define the link between the independent and dependent variables, regression analysis was performed.The following equation was typically taken as the regression model;

$$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where: Y= Performance of Public Hospital;

β_i= Co-efficients;

X_1= Data storage,

X_2= Information Security;

X_3= Information integration,

X_4= Service delivery;

ε= Error-Term

3.7 Ethical Considerations

The researcher acquired a data collection authorisation letter from Kenyatta University prior to beginning the data collection process. The research also applied for a NACOSTI Permit letter, which allowed for data collection. The Garissa County government's management was informed of the analysis before any data is collected. The participants were assured that the provided information will be held confidentially. Citations were done on the reviewed information related to the study.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

The interpretation and presentation of the findings are discussed in this chapter. The study's goal was to see how HMIS capacity affected the performance of public hospitals in Garissa County, Kenya. To show the data, the researcher employed frequency tables and figures. The purpose of the discovery was to respond to the study's research questions. Data was compiled, reports were written in the form of tables and figures, and qualitative analysis was conducted in prose.

4.2 Response Rate

The study was conducted on 62 information technology specialists working in the two hospitals in Garissa. The 62 were choosen from different departments with 11 being network specialists, 15 database administrators, 9 programmers and 27 lab technicians. The respondents completely filled 62 questionnaire out the 62 making a response rate of 100 Percent. According to Mugenda & Mugenda (2013), a data response rate of 50 percent is suitable for analysis in a generalization study, 60 percent is good, and 70 percent and above is outstanding. The high response rate can be linked to the researcher's data collection technique, which includes research assistants dispensing questionnaires, waiting for responses to complete, and pushing respondents to fill in.

4.3 Analysis on Demographic Characteristics

Demographic characteristics included age, gender and education level. It helped understand how various demographics influenced the study outcome. The respondents were asked to provide their gender, degree of education, and age as part of the general

statistics. The classification of the study's various outcomes was based on this information from the respondents.

4.3.1 Respondents' Gender

The purpose of the study was to determine the gender of the participants. Gender analysis was used to establish the number of female and male IT specialists working in Garissa County's public hospitals. The results are shown in Figure 4.1.

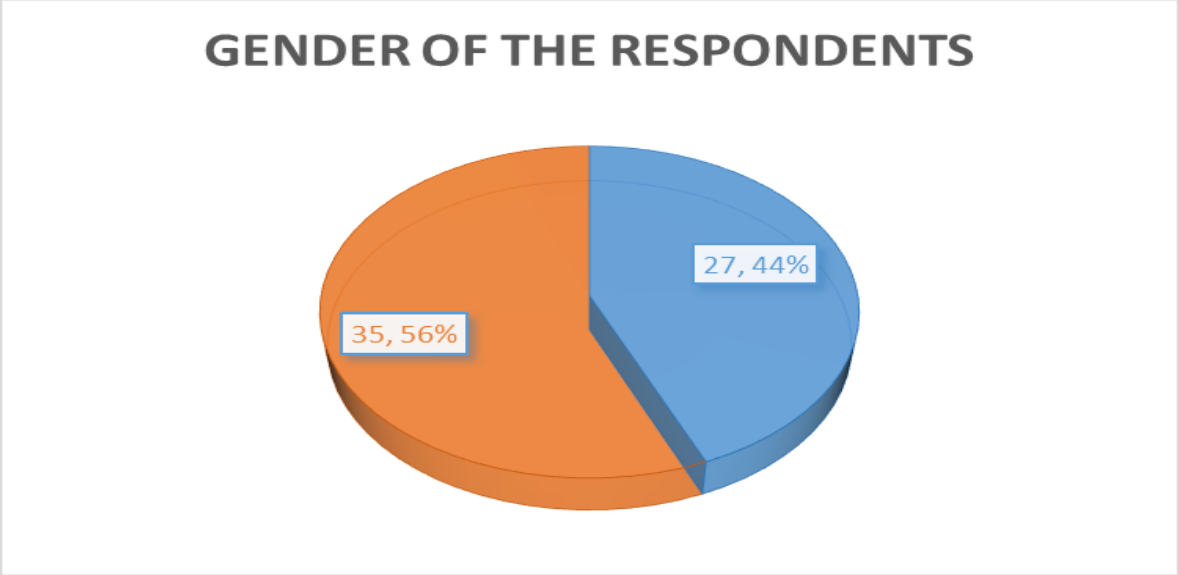


Figure 4.1 Gender of the Respondents

Source: Researcher (2021)

According to Figure 4.1, 27 of the 62 targeted respondents were male and 35 were female. The female were the majority represented by 56Percent of the sampled population. The expectation of the study was that majority of the IT specialised in the public hospitals will be male. However, the findings proves otherwise. This could be attributed to increased empowerment of the girl child in Garissa County and its neighbouring counties in the northern frontier and the fact that majority of the women in

semi-arid region prefer working close to their families to cater for the extended family and other family chores. There was gender balance in the response rate and therefore the results presented in this study represents views from the majority of men and the majority of women in Garissa County.

4.3.2 Respondent`s Age.

The study further aimed to investigate the ages of the respondents. This was aimed to help in identification of differences that maybe as a result of age differences. Asking for age potentially gain a lot of valuable detail during analysis of their feedback by surveying age ranges and determining the age group helps relating the results with the age group. The results were displayed in Table 4.1.

Table 4.1 Age of the Respondents

	N	Minimum	Maximum	Mean	Std. Deviation
Age	62	21	56	32.19	7.665
Valid N (listwise)	62				

Source: Survey Data (2021)

The results on the age of the respondents presented in Table 4.2 indicates that the eldest employee was 56 years old while the youngest was 21 years old. The mean age of the 62 respondents was approximately 32.19. The reason for doing the mean age and deviation is to determine average age of the majority of the IT specialist and variation from the mean age which will help in determine the experience level. For instance; the results depicts a standard deviation of 7.665 indicating that majority of the IT specialists were between 25 years and 39 years old (32.19 (mean) + or – 7.665 (std. Deviation). These potrays that majority of the IT specialist in the public hospitals in Garissa county are young and

inexperienced. As a result, the inexperience could lead to poor performance of the public hospitals. In this study therefore, it can be deduced that majority of the respondents were young and may lack enough experience to handle complicated IT issues and therefore poses a threat to the IT department of the specific hospitals sampled.

4.3.3 Respondent`s Level of Education.

The questionnaire covered four levels of education: "o" level, diploma, undergraduate degree, and master's degree. The theoretical skills acquired and whether they are relevant to the speciality and duties at the hospitals were determined by the level of schooling.

Table 4.2 Level of Education

		Frequency	Percent
Valid	Diploma Certificate	18	29.0
	Undergraduate	25	40.3
	Masters	19	30.6
	Total	62	100.0

Source: Survey Data (2021)

Table 4.3 shows that undergraduate degree was the greatest level of education for 25 of the 62 (40.3 percent) respondents. A total of 29Percent of respondents have a diploma as their highest level of schooling (18 out of 62). Out of 62 respondents, 19 had a master's degree as their highest level of education (30.6 percent).The results indicates that the minimum qualification for an IT specialist in public hospital was diploma certificate. Degrees were the majority indicating the majority of tasks and responsibilities in the IT department within the public hospitals require a degree level person. It therefore important to consider a degree specializing in IT as a critical requirement for working in the IT department. Information technology requires a lot of skills and knowledge and for one to get employment in the health sector, at least a diploma is required.

4.4 Analysis Based on Data Storage

Respondents were given numerous statements to rate their level of agreement with in order to answer the research question of whether data storage affects the performance of public hospitals in Garissa County. The mean was a number between 1 and 5, with 5 indicating high agreement and 1 indicating significant disagreement. In table 4.3, the statements were presented.

Table 4.3 Analysis Based on Data Storage

	Mean	Std. Dev
We keep electronic health records	1.1935	.3983
Patient records are managed electronically	1.2742	.4498
We Provide back up in cases of emergency for patients records	2.597	.5569
There is provision of medical services from a distance	3.419	.6414
We Share information between patients and healthcare provider	4.000	.5432
Aggregate Mean	**2.4967**	**0.5179**

Source: Researcher (2021)

Table 4.4 aggregate mean of 2.4967 shows the average general responses for all the statements. The aggregate mean indicates that the data storage in public hospitals in Garissa county was not effectively done. The statements indicate that that majority of the information technology specialists involved in the study argued that they do not keep electronic health records (M=1.1935), patient's records were not managed electronically (M=1.2742) and they do not provide back up for cases of emergency records (M=2.597). The respondents moderately agreed that they provide medical services remotely (M=3.419. However, there was evident high sharing of information between patients and health care providers (M=4.000). This indicates that there IT systems are poor to handle data storage for all the patients. Thus sharing of information was done manually between

patient and the health care provider. It is clear that the public hospitals contacted cannot safely store data for the patient and therefore presenting a possibility of increased costs of duplicated tests and manual search of patient records.

The findings of the study backed up Orang'i, Ogalo, and Wasike's (2019) research of the impact of healthcare information systems on service delivery at private hospitals in Nairobi County, Kenya. The outcomes of the investigation revealed that data storage is employed in the hospital, and storage and retrieval procedures are in place, but that there is still a lot of work to be done. The usage of healthcare medical storage technology has been widely used, which has sped up the procedure while also allowing patients to be monitored more readily. Verbeke et al., (2016) echoed the findings on the degree to which information and communications technology (ICT) methods can help to improve the quality and efficacy of health services in Sub-Saharan African hospitals, as well as the availability of secondary use of clinical information that can allow non-redundant reporting of health and care outcomes. These clearly indicates that the hospitals used in the study had efficient ways of data storage.

4.5 Analysis Based on Information Security

To examine the effects of information security on the performance of public hospitals in the hospitals under study, respondents were provided with five statements stating the importance of information security and asked to rate their agreement to the statements. The results helped to determine the level of information security in public hospitals in Garissa County, Kenya.

Table 4.4 Analysis Based on Information Security

	Mean	Std. Deviation
The hospital is able to detect frauds by utilizing health management information systems.	3.3871	1.2721
The systems enables us gathering information about patients	3.7903	.9605
Checking quality by comparing perception of services delivered with expected standards is easy	2.3548	1.0258
The information systems enables us to detect errors	2.7516	1.0663
It is possible to communicate with the patients electronically	2.3065	1.4996
Aggregate Mean	**2.9181**	**1.1649**

Source: Researcher (2021)

For the healthcare industry to preserve personal patient information and comply with regulations, information security is a must. As a result, more effective healthcare information security solutions are required to assist mitigate the risks of hostile data attacks and technical failure. According to the claims, the information security in Garissa's public hospitals was frightening, with an aggregate mean of 2.9181 and a standard deviation of 1.1649. The hospital was able to detect fraud (M=3.3871) by using health management information systems and the assertions presented and their mean (M), the system enables the hospital gather information about patients (M=3.7903), checking quality by comparing perception of services delivered with expected standards was easy (M=2.35480 and it was possible to communicate safely with the patient electronically (M=2.3065). It is obvious that the public hospitals in Garissa County have not established a standard for the permissible use of the hospital's information technology, including networks and apps, to ensure data security, integrity, and availability.

According to a report conducted by HIMSS Analytics (2018) on security in health information systems and service delivery in the United States' health-care industry, supported the findings that information security breaches in health-care organizations has increased significantly, as has the number of threats in hospitals. Asai and Fernando (2017) on a study on effect of information system security on health care performance agrees that Human factors are responsible for 80Percent of information security violations, which also confirms that human errors account for a significant portion of information security breaches. In addition, a study by Deloitte (2017) found that 91 per cent of participant participants are concerned about safety deficiencies of employees and that 79 per cent of respondents mention human factors as the primary cause of information security threat. Training on health information systems is vital as well as the severity and consequences of possible security breaches.

4.6 Analysis Based on Information Integration

This was aimed at determining the effect of information integration on the performance of the selected hospitals. Integration of information is critical for improving operations and the quality of hospital services. Furthermore, information integration can be utilized as a tool for monitoring the performance of physician-provided patient services. To capture this, respondents were asked to rate their agreement to five statements regarding information integration and results summarised in table 4.6.

Table 4.5 Analysis Based on Information Integration

	Mean	Std. Deviation
The health management information systems are thoroughly integrated into the hospital operations.	1.7258	.8526
Strong primary care and vital public health functions are the foundations of integrated health services.	1.7999	.7928
The hospital encourages people to choose treatments based on their overall needs, and it offers a wide range of services throughout their lives, including disease prevention, diagnosis, treatment, disease management, long-term care, rehabilitation, and palliative care.	2.9194	.8550
With a commitment to universal health coverage, providing treatment that is comprehensive and personalized to people's changing health needs and goals.	1.2742	.9946
The hospitals make sure that care is tailored to the individual's needs and that it is well-coordinated across multiple providers and locations.	1.8097	1.0423
Aggregate Mean	**1.9058**	**0.9075**

Source: Researcher (2021)

Table 4.6 shows that the majority of respondents (M=1.7258) strongly disagree that hospital operations are fully integrated by health management information systems. The integrated health services (M=1.7999) did not have a strong primary care foundation or key public health functions. Health protection and promotion, disease prevention, diagnosis, treatment, disease management, long-term care, rehabilitation, and palliative care are moderately encouraged by the hospital, which provides a wide range of care across the life course, including health protection and promotion, disease prevention, diagnosis, treatment, disease management, long-term care, rehabilitation, and palliative care (M=2.9194). With a commitment to universal health coverage (M=1.2742), providing care was not comprehensive and not suited to people's increasing health needs and ambitions. Healthcare integration around people's needs and efficient coordination

across multiple providers and contexts were never ensured by hospitals (M=1.8097). The aggregate mean indicates that the information integration in public hospitals in Garissa County was alarming. As a result, due to poor integrated care, there is a possibility of poor access to health care services, increased hospitalizations and readmissions, poor adherence to treatment.

Qureshi (2013) conducted a review research on the impact of healthcare infrastructure on healthcare service delivery in Kenya, which backed up his claims. The study discovered that the quality of HMIS systems is a significant factor in predicting HMIS acceptance, and that information integration is critical for successful eHealth adoption. Furthermore, Gatero (2018) revealed that clinicians can use information integration to conduct e-searches to access and share health information with colleagues in different areas of the world. However, the study discovered that they are limited in their ability to conduct searches due to a lack of HMIS tools. The study also found that the high cost of computers and a shortage of computers are deterring rural hospitals from adopting eHealth. Therefore, HMIS program increases accessibility for people living at home with severe chronic illnesses and that the HMIS application also helps nurses save time and make their jobs easier.

4.7 Analysis Based on Service Delivery

The respondents were given five statements with which they were to assess their agreement or disagreement in order to examine the effect of service delivery on the performance of the public hospitals chosen for the study. The need to assess service delivery under IT support was to assess the provision of care and services across the life course, to assess the level of care as well as their socioeconomic circumstances, and to

ensure that care is goal-oriented in terms of how people make health care decisions, assess outcomes, and measure success.

Table 4.6 Analysis Based on Service Delivery

	Mean	Std. Deviation
There is improved financial and human resource management	2.6774	.9880
Patients are satisfied with the standard of medical services they receive	1.4516	1.5303
There is reduced waiting hours by patient in the public hospitals	1.4032	1.0782
There is reduced cost of movement in search for healthcare services	3.0161	1.2739
There is availability and accessibility of health services that meet a basic quality criterion	2.7097	1.4974
Aggregate Mean	**2.2516**	**1.2736**

Source: Researcher (2021)

The study summarised the five statements on service delivery with the aim to come up with conclusion based with all the statements. Table 4.7 shows that it majority disagreed that there was improved financial and human resource management (M=2.6774). Patients are not satisfied with the standard of medical services they receive (M=1.4516, Std. Dev=1.5303). The results indicates that waiting hours by patient in the public hospitals have not reduced (M=1.4032 Std Dev=1.0782).The cost of movement in search for healthcare services has remained the same over the years (M=3.0161, Std Dev=1.2739). There was no availability and accessibility of health services that meet a basic quality criterion (M=2.7097, Std. Dev=1.4974). The aggregate mean of 2.2516 and standard deviation of 1.2736 indicates that service delivery within the public hospitals in Garissa county was poor. The results indicates that there was huge challenge by the employees in

fostering digital partnerships that alleviate physician burdens and projection for service delivery gaps was a challenge due to poor systems.

The study supported the assessment by Olatokun and Adeboyejo (2017) who looked into the use of HMISs by reproductive health workers (RHWs), the impact of HMISs on their job functions, and the barriers that prevent HMISs from being fully utilized in Nigeria. The study found that effects of HMIS use on hospital activities were faster access to relevant medical knowledge, easier information sharing with colleagues, and increased productivity. HMISs were primarily used to access educational, health, and research data. The main obstacles to HMIS use, according to the findings, were erratic power supply and insufficient access to HMIS facilities. Additionally, Muhoho and Muchiri (2015) supported that that the integration of HMIS programs greatly increases birth life expectancy and lowers infant mortality. The study suggested that the African countries should invest considerably in HMIS to strengthen their systems of health in order to achieve socio-economic growth. Kanyua (2015) pointed that the management of medical equipment requires other important activities that ensure efficient planning and projection of equipment, its procurement and its operation. The study showed that HMIS infrastructure installation is a significant impediment to HMIS adoption.

4.8 Performance of Public Hospitals.

This was aimed at finding out how the hospitals under study were generally performing. To capture this information, respondents were to rate their agreements against statements on performance of public hospitals. The expectation from the study was that public hospitals in Garissa were not performing well.

Table 4.7 Performance of Public Hospitals

	Mean	Std. Deviation
There is adequate solution reliability to the patients in public hospitals in Garissa County	2.4355	1.4357
The patients are satisfied by the health care services offered	2.9194	.9286
The hospital generated revenues are sufficient to cover the operating costs	1.4129	.5614
The cost per patient has been revised to ensure affordability by majority of the patients	1.6935	.7594
The ratio between patient and doctors is sufficient	1.4194	.8811
Aggregate Mean	**1.9761**	**.9132**

Source: Researcher (2021)

The findings in table 4.9 indicates that there was inadequate solution reliability to the patients in public hospitals in Garissa County (M=2.4355, Std Dev=2.4355). The patients were not satisfied by the health care services offered (M=2.9194, Std Dev= 0.9286). The hospital generated revenues were insufficient to cover their operating costs (M=1.4129, SD= 0.5614). Majority of the respondents disagreed that there was cost per patient revision to ensure affordability by majority of the patients (M=1.6935, SD=.7594). The ratio between patient and doctors was not sufficient (M=1.4194, SD=.8811). The study generally indicated that the performance of public hospitals in Garissa county was poor as indicated by very low patient vs doctor ratio, cost per patient, low fees collected and low patient satisfaction.

Inequities and inefficiencies are created by obstacles in the distribution of facilities and inpatient beds, according to Seitio-Kgokgwe, Gauld, Hill, and Barnett (2014). Inadequate resources hinder the hospitals' ability to provide services. In Botswana, there are severe problems with the quality of care. Service delivery is hampered by a lack of resources. Lack of finance, equipment, drugs, oversight, political involvement, and insufficient staffing are all key difficulties in public hospitals, according to Kakooza, Tusiime, Odoch, and Bagire (2015). The configuration of effective use of money, professional management, and competent governing structures are all required for good hospital management.

4.9 Regression analysis.

To evaluate the association between hospital performance and the independent variables, the researcher used multiple regression analysis. This analysis was under the assumption that the health management information systems capability (data storage, Information security, information integration and service delivery) significantly affects performance of the public hospitals.

4.9.1 Model summary

The model summary presents the coefficient of determination (R squared) which presents the portion of the dependent variable (performance of public hospitals) which was explained by the independent variables (data storage, Information security, information integration and service delivery). The model also presents the coefficient of correlation (R) which shows the strength of relationship between variables.

Table 4.9 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.733[a]	.537	.513	2.993

Source: Researcher (2021)

Table 4.10 shows the general summary of the regression model performed. The adjusted R squared was at 0.513 which is 51.3 Percent. This means that 51.3 Percent changes in the dependent variable (performance of public hospitals) was explainable by the independent variables (Data storage, Information security, information integration and service delivery). Other factors/variables not considered in the model explain 48.7 Percent (100-51.3) of the changes in the performance of public hospitals in Garissa County.The study concurs with Verbeke *et al.,* (2016) that information system implementation determines 64.7 Percent changes in hospital performance Bukachi and Pakenham-Walsh (2017) found that HMISs determines 58.9Percent changes in service delivery. A study carried out by Idowu (2013) agrees that HMISs explains 62Percent changes in performance of hospitals in Nigeria

4.9.2 Analysis of Variance

This section presents the overall model significant level. The F critical was compared with the F critical to determine the model fitness.

Table 4.10 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1283.179	4	320.795	267.639	.000[b]
	Residual	68.321	57	1.199		
	Total	1351.500	61			

a. Dependent Variable: Performance of Public Hospitals

b. Predictors: (Constant), Data storage, Information security, Information integration and Service delivery

The overall significance level of the model (sig=0.000) indicates that the variables can be used to explain the changes in the performance of public hospitals in Garissa at 95Percent confidence interval.

4.9.3 Regression Results

The main purpose of the regression analysis was to determine which of the independent variables was significant in determining the level of performance.

Table 4.11 Coefficients[a]

Model		Un Coefficients B	standardized Std. Error	Standardized Co-efficients Beta	t	Sig
1	(Constant)	-9.414	2.680		-3.512	.001
	Data Storage	.738	.342	.220	2.157	.035
	Information Security	3.263	.557	.608	5.858	.000
	Information Integration	1.114	.407	.551	2.737	.000
	Service Delivery	.031	.353	.008	.087	.931

a. Dependent Variable: Performance of Public Hospitals

Source: Researcher (2021)

The adopted model was that $Y = -9.414 + 0.220X_1 + 0.608X_2 + 0.551X_3 + \varepsilon$

Table 4.10 shows that out of the 4 independent variables, only 3 were significant to use for the regression analysis. Observing the sig values, a sig value of less than 0.05 which is the level of significance at 95Percent confidence interval indicates that the there is a significant relationship between that data storage (sig=0.035<0.05), information security (sig=0.000<0.05) and information integration(sig=0.000<0.05) with performance of hospitals. Service delivery had insignificant relationship with performance of public hospitals (sig=0.931).

The study agrees with Orang'i, Ogalo and Wasike (2019) that data storage significantly affects healthcare service delivery. Information and communications technology (ICT)

and data storage, according to Verbeke et al., (2016), can help to improve the quality and efficacy of health care. Data storage had no effect on service delivery, according to Bukachi and Pakenham-Walsh (2017).The findings was supported by HIMSS Analytics (2018) that security in health information systems significantly affects service delivery. Asai and Fernando (2017) concurs that information system security significant affects health care performance.

The conclusions of the study were backed up by Gatero (2018), who looked at the impact of disease management systems on the performance of Kenyan public hospitals. Information integration has a favorable substantial effect on performance in public hospitals, according to the study. According to Nilsson (2012), HMIS application and information integration have a considerable impact on organizational performance. According to Olatokun and Adeboyejo (2017), IT service delivery has a major impact on hospital performance. Cholo, Muhoho, and Muchiri (2015) also discovered that the delivery of health-care information system services has a significant impact on public hospital performance.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the data findings on the impact of HMIS capacity on public hospital performance in Garissa County, Kenya. The study's conclusions and recommendations are also highlighted in this chapter, which are based on the study's findings. The summary of findings, conclusions, recommendations, and areas for additional investigation are all included in this chapter.

5.2 Summary of the Study

The study results indicate that the hospital does not keep electronic health records and patient's records were not managed electronically. This indicates that there IT systems in the public hospitals in Garissa were poor to handle data storage for all the patients. Thus sharing of information was done manually between patient and the health care provider. It is clear that the public hospitals contacted cannot safely store data for the patient and therefore presenting a possibility of increased costs of duplicated tests and manual search of patient records. The application of healthcare medical storage technology was ineffective, making the procedure of handling a patient tiresome.

The findings show that the hospital's information security infrastructure allows it to collect patient information. It was discovered in the study that determining quality by comparing perceptions of services given to expected standards was difficult. It is obvious that the public hospitals in Garissa County have not established a standard for the permissible use of the hospital's information technology, including networks and apps, to ensure data security, integrity, and availability. For the healthcare industry to preserve personal patient information and comply with regulations, information security is a must.

As a result, more effective healthcare information security solutions are required to assist mitigate the risks of hostile data attacks and technical failure.

The findings show that the health management information systems did a poor job of integrating hospital operations. The integrated health services were not built on a foundation of solid primary care and vital public health functions. It was difficult to integrate health protection and promotion, illness prevention, diagnosis, treatment, and disease management, long-term care, rehabilitation, and palliative care. Healthcare integration around people's needs and successful coordination across multiple providers and locations were never guaranteed by hospitals. There is a risk of poor access to health care services, higher hospitalizations and readmissions, and poor adherence to treatment as a result of poor integrated care. Information integration is crucial for enhancing hospital operations and service quality. In addition, information integration can be used to track the effectiveness of physician-provided patient treatments.

Patients in Garissa County were dissatisfied with the quality of medical treatments they received due to long wait times, the cost of travel in pursuit of healthcare, the availability and accessibility of health services, and a low patient-to-doctor ratio. The need to assess service delivery under IT support was to assess the provision of care and services across the life course, to assess the level of care as well as their socioeconomic circumstances, and to ensure that care is goal-oriented in based on how people create medical decisions, assess outcomes, as well as measure success.

5.3 Conclusion of the Study

HMIS helps to save on cost, ensure smooth accessibility and storage of data in public hospitals. Majority of the information technology specialists working in public hospitals as well as other health care providers have justified that HMIS has played a great role in

ensuring health care is provided at its best but the state of HMIS in Garissa County public hospital is worrying. The study concludes that data management and storage has been made much easier by HMIS. However, Public hospitals in Garissa are poorly electronically managing their data and providing medical services in the vast county is a challenge. Patients records poorly stored and there no back up just in case an emergency happens.

HMIS has played a major role in ensuring information is securely stored. This is because hospitals operations are fully supported by the system which is distributed sufficiently but public hospitals in Garissa county do not adhere to the service providers. Error detection can also be concluded to be much easier when the system are in use but in case of Garissa, detection is not easy due to poor storage, poor information security and poor information integration. The study also concludes that public hospitals have not fully utilized the use of the HMIS to ensure information integration. Information integration is importance in health care sector as information is needed continuously in the hospitals regarding patients.

5.4 Recommendations

The investigation came to the conclusion that there was strong information integration in public hospitals. The management needs to make sure the hospitals get the most out of the HMIS. The health management information system should provide complete operational support for public hospitals. The system providers should be informed that all public hospitals in Garissa County require adequate distribution of health management information systems.

Additionally, the hospital administration and system administrators need to make sure they strictly follow the instructions provided by the service providers. By doing this, the proper integration of the information will be guaranteed. In general, hospitals should concentrate all of their efforts on utilizing health management information systems to accomplish information integration.

5.5 Areas for Further Research

The use of health management information systems in improving the performance of public hospitals in Garissa County, Kenya was studied in this study. The study suggests that similar research to be done in different counties and try to come up with relationships between the use of HMIS by developed counties and less developed counties. The study also suggests that after a discussed period of time, the study should be re-done in the same hospitals and with the same respondents but capturing the improvements done. This will help in coming up with more recommendation and discovering new relationships. The study suggests a further study which considers patient as the main respondents.

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APPENDICIES

APPENDIXI: LETTER TO THE RESPONDENTS

Re:Letter to the Respondents

Find the attached questionnaire and please fill them honestly as possible. The data collected will be for education purposes only. The Garissa County government's management will be informed of the analysis before any data is collected.

Yours Faithfully

Abdihakim

0725611274

APPENDIX II: QUESTIONNAIRE

Answer the following questions by using a tick at the same stage as the statements you agree with.

SECTION A: BACKGROUND-INFORMATION

1.Gender

Male [ ] Female [ ]

2.Age 19 – 25 years [ ] 26– 35 years [ ] 36 – 45 years [ ]

46-55 years [ ] Above 55 Years [ ]

3.Level of education: "O" Level [ ] Diploma[ ]

Degree [ ] Masters[ ]

Any other (specify)_____

SECTION B: DATA STORAGE

he following are several ways in which the information system for the health management system is used to provide health care services. Please state whether you agree with the claim or disagree. 1 refers to serious disagreement, 2 implies disagreement, 3 refers to uncertainty, 4 to consensus, and 5 shows strong support.

		1	2	3	4	5
5	We keep electronic health records					
6	Patient records are managed electronically					
7	We Provide back up in cases of emergency for patients records					
8	There is provision of medical services from a distance					
9	We Share information between patients and healthcare provider					

10. Indicate how data management system has contributed to the improved service delivery……
……..

SECTION C: INFORMATION SECURITY

Statements	1	2	3	4	5
11. The hospital is able to detect frauds by utilizing health management information systems.					
12. The systems enables us gathering information about patients					
13. Checking quality by comparing perception of services delivered with expected standards is easy					
14. The information systems enables us to detect errors					
15. It is possible to communicate with the patients electronically					

16. Indicate the level of your information security and indicate the challenges in ensuring information security…….

……..

SECTION D: INFORMATION INTEGRATION

Statements	1	2	3	4	5
The health information systems are thoroughly integrated into the hospital operations.					
Strong primary care and vital public health functions are the foundations of integrated health services.					
The hospital encourages people to choose treatments based on their overall needs, and it offers a wide range of services throughout their lives, including disease prevention, diagnostic, therapy, infection control, long-term care, rehabilitation, and palliative care.					
With a dedication to universal health coverage, providing treatment that is comprehensive and personalized to people's changing health needs and goals.					
The hospitals make sure that care is tailored to the individual's needs and that it is well-coordinated across multiple providers and locations.					

22. What are some of the measure that should be taken to ensure that the health management information system is effectivene.....

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SECTION E: SERVICE DELIVERY

Statements	1	2	3	4	5
23. There is improved financial and human resource management					
24. We use internet for research, communication and training					
25. It has become easier to communicate information amongst department in the hospital					
26. Reduces the cost of movement in search for healthcare services					
27. Use of health information systems to facilitate decision making					

SECTION F: PERFORMANCE OF PUBLIC HOSPITALS

Statements	1	2	3	4	5
There is adequate solution reliability to the patients in public hospitals in Garissa County					
The patients are satisfied by the health care services offered					
The hospital generated revenues are sufficient to cover the operating costs					
The cost per patient has been revised to ensure affordability by majority of the patients					
The ratio between patient and doctors is sufficient					

33. What would you recommend to be done by organization that has adopted the use of ICT in the provision of healthcare services to improve their performance?

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Thank you so much for your time.