INFLUENCE OF ELECTRONIC HEALTH RECORDS ON THE PERFORMANCE OF HEALTHCARE PROVIDERS AT PUBLIC HEALTH FACILITIES IN SOUTH SUDAN

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DECLARATION AND RECOMMENDATION

This thesis is my original work and has not been presented for a degree or any other award in any other University.

Sign: ~~~~~~~~~~~~~~~~ Date: 19th September, 2023

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I/We confirm that the work reported in this thesis was carried out by the candidate under my/our supervision.

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ABSTRACT

The study took place at Juba teaching and referral hospital. The study used a case study approach. The aim of the study was to establish the influence of electronic health records systems adoption on the performance of healthcare providers in public health facilities. Specifically, the study examined how system quality, record quality, service quality, and knowledge quality affected the performance of healthcare providers in public health facilities at Juba Teaching Hospital. Descriptive research design was used to determine the influence of electronic health records systems adoption on the performance of healthcare providers. The study population comprised of 226 health workers working in Juba county public health facilities, including the hospital administrators, pharmacists, technologists, doctors, clinical officers, and nurses. A sample of 145 health workers was used for this study. The study employed the simple random sampling technique, where all the elements had equal chances of being chosen. A structured questionnaire was used in collecting primary data for this study. The secondary data was realized from books, journals and previous studies done. The study employed the use of a quantitative approach to fulfill its purpose. Furthermore, Pearson correlations were used to assess the strength of the association between the study variables. Finally, multiple regressions were run to find out the collective predictive power of the independent factors on the dependent variables. The study found and concluded that at the significance level of 95%, the study concludes that service quality and knowledge quality were significant factors in influencing the performance of healthcare providers at Juba Teaching and Referral Hospital. Further, the study concludes that system quality and record quality were insignificant determinants of the performance of healthcare providers at Juba Teaching and Referral Hospital. The study also concludes that the knowledge quality was the most significant factor in the performance of healthcare providers at Juba Teaching and Referral Hospital; followed by service quality. The study recommends that in promoting system quality; the EHR system should be reliable, secure, and easy to use. It should be able to handle large volumes of data without crashing or causing delays. The system should also have proper backup and disaster recovery mechanisms to ensure data is not lost in case of a system failure. The study recommends that in promoting record quality; EHR systems should ensure that the quality of the patient record is maintained. The system should be able to capture complete and accurate patient information, including medical history, medications, allergies, and other relevant details. The system should also be able to update the record in real-time to ensure that the information is always up to date. The study recommends that in promoting service quality; the vendor should provide training and support to healthcare providers to ensure they are proficient in using the system. The vendor should also have a responsive support team to address any issues that may arise promptly. The study recommends that in promoting knowledge quality; EHR systems should have a user-friendly interface that enables healthcare providers to access patient information easily.

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CHAPTER ONE

INTRODUCTION

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1.1 Background of the Study

This study was anchored on health system strengthening pillar of health information system. Reliable and timely health information is essential for policy development, proper health management, evidence-based decision-making, rational use of resources, and the monitoring and evaluation of the public health situation, health care delivery and outcomes (World Health Organization [WHO], 2019). The study examined influence of electronic health records system on the performance of healthcare providers in South Sudan with full activity implementation performed in Juba Teaching and Referral Hospital. Currently, South Sudan has adopted an Open MRS and DHIS2 system in 77 County Health Departments (CHDs) and 20 Health Institutions since 2019. Electronic health records systems are supported by the development partners like UNDP and some INGOs with objective of improving quality of care through effective and efficient data management. However, South Sudan continue to majorly rely on paper-based records system for health data management, private clinics and hospitals focus more on finances and internal administration than medical data management that makes electronic health records systems implementation unprioritized. Also, South Sudan's regulations prevent the growth and localization of the electronic health records system business. To fulfil patient care goals, South Sudan is building and developing health systems and this study sought to explore influence of electronic health records system adoption on the performance of healthcare providers in public health facilities and the recommendations provided are implementable, policy makers can utilize to change health system outcomes.

1.2 Electronic Health Records System in South Sudan

Just to mention an instance of technology innovation that has caused changes on how healthcare sector functions, electronic health records system definitely is a key example.

Perhaps before the advent of technological knowhow, specifically electronic health records, all medical records keeping were manual based, storage format purely was on paper formats (Abiy et al. 2018). Although storing records on paper has numerous advantages including simplicity, straightforwardness, generally recognized and inexpensive to establish, utilization of electronic records may be far better because it assures quality. Paper records, in actuality, demerits are a burden in healthcare setting since they are hurdle to accessibility, illegible, hard to access remotely, and costly to keep huge volumes of data. Therefore, EHRs generally allow clinicians have access to well-organized records (Ben-Assuli, 2015). In order to deliver secure patient care, practice improvement technologies such as computerized ordering and prescription systems also greatly contributes.

As recently presented, the Global Strategy on Digital Health 2020–2025 through the World Health Organization (WHO, 2022), outlined that some nations have already achieved the desired stage for adoption of technologies. The electronic health records (EHRs) is a reliable platform that enables medical professionals to make informed judgments and implement rules that keep healthcare facilities in good condition necessary for a successful health system (WHO, 2019). In response to infectious illness and other crucial occurrences, consistent and timely data are needed. Therefore, better patient record access is essential for public sector healthcare organizations to manage the public's health status. By making timely health data generated and kept in the system available, the Electronic Medical Records (EMRs) system has become a trustworthy method of public health information management (WHO, 2015).

To assure responsive reactions and the coordinated activities, the better choices particularly among patients seeking care under the most vulnerable circumstances, it is essential to have instant access to patient data in one location, at the appropriate time and in a correct reporting format (Gao & Yu, 2020). An interoperable electronic health records system allows access and exchange of the health data that effect monitoring and reporting mechanisms for the

suspected and confirmed diseases, treatment plans and abnormal circumstances (Dixon et al., 2020). This helped health care providers to identify characteristics of the pandemics among the affected populations faster, enable rapid containment and mitigation.

Through a protected computer networks, the electronic health records produced through the integrated health information systems helps authorized healthcare professionals have access to networks in consultation and information sharing across healthcare settings (Salleh et al., 2021). As a component of the wider health management information systems, the electronic health records systems do play a number of tasks, one of which is acting as a bridge between different healthcare institutions and are widely acknowledged to provide better treatment, use less resources for healthcare and enhance clinical judgment (Liebovitz, 2015). In the absence of comprehensive evaluation, the system's deployment might nevertheless, negatively affect work performance of clinical staff team members.

In order to increase patient safety, efficiency and quality, many nationalities in recent recognized the value of an information and communication technology (ICT), the health care personnel might manage a variety of ailments in the region by using the EMRs or electronic health records system. This was in contrast to the scenario before development of these systems when public health observations depended on several communication networks to provide an integrated health observed data where the patients were often given cards to take with them whenever they visit the health care clinics, which makes it easier to get their data from the files that stay safeguarded in a documentation or records room and therefore, electronic health records system enhanced reporting in healthcare industry by facilitating a quick data gathering, processing and trustworthy transmission of data resources (Cucciniello et al., 2015).

The known concerns on the privacy in the interoperability of electronic health records system voiced in the United States of America regarding information pertaining to patients and storage by the practitioners who routinely collect data directly from the patients or the insurance companies that have covered those patients (Tavares & Oliveira, 2017). In the view of patients, healthcare services pricing and cost of healthcare services differs for instance according to NHS and PHI models, it is worth investigating if this drives electronic health records system portal uptake differently and concerns over the information included may be used in PHI model to justify an increase in the premium paid by a patient's health insurance company (Tavares & Oliveira, 2016). Governments want to encourage utilization of electronic health records system portals in both USA and Europe.

In Europe, patients may use electronic health records system portals from governmental organizations altogether with typical healthcare providers like clinics, hospitals (Rodrigues et al., 2013). In Portugal specifically, the Portuguese government promoted the use of EHRs portals as subset of the larger e-government plan with intent to simplifies services and communications between public service providers and residents (Odone et al., 2021). The Portugal Ministry of Health's SNS Platform or simply NHS Portal is an electronic health records national portal for scheduling appointments with primary healthcare physicians to render electronic prescriptions, access medical data and contact healthcare professionals (Catan et al., 2021).

The first Digital Health Innovation and Learning Center where experts may create and assess digital health solutions, compile, promote best practices and encourage innovations was launched on 6th August, 2021 by the Ethiopian Ministry of Health (MOH) (Manyazewal et al., 2021). A 54.7 million people subscribed to telecommunications as of April 30, 2021. (Getachew et al., 2022) and as well 52.8 million mobile phones connected, 25 million data and internet provided, 349,000 fixed broadband and 923,000 fixed service customers reached,

this telecom population was 95%, geographic coverage 85.4%, and density 50%45. Safaricom, Vodafone, Vodacom, CDC Group, and Sumitomo Corporation won a new national-wide telecom license from the Ethiopian government on 22 May 2021 after submitting a US$850 million financial proposal (WHO, 2018). The Consortia will spend $8 billion and employ one million and five hundred thousand people. Ethiopian Health Sector Transformation Plan highlights a need of developing digital health infrastructure to deliver high-quality treatment to all Ethiopians (WHO, 2017).

Kenya has nationalized DHIS2 to gather health sector data (Kariuki et al., 2016). DHIS2 replaced Excel after issues. Inability to adequately study data due to aggregation, lack of error-checking, inadequate data, and limited decision-making ability (Mugo & Nzuki, 2014). DHIS2 advantages are: free, open source (licensed under the new Berkeley Software Distribution license), supports data gathering and utility in different health system levels, it has a Web-based interface that can be accessed from multiple devices, and it has a large global user base (Muinga et al., 2020). Health records officials at facilities or counties input data into the system.

1.3 Statement of the problem

In South Sudan, Ministry of Health (MOH) treated Health Information System (HIS) a replicate of a web-based District Health Information Software (DHIS2) meant for data collection, analysis and reporting. Health information utilization in Africa ranges between 10 to 56% (Shiferaw et al., 2017) and there is lack of capacity to use this data across Africa for healthcare managers to evaluate the impacts of changes put in place (Nyamtema, 2010). Since data collected is send to the high-level management, data gatherers are not the end users of the generated information and determining performance of healthcare providers based on these generated reports become a challenge. In South Sudan, out of all DHIS2 data generated, only 3% was analyzed and that means MOH was data focused not information

focused. Therefore, tracking progress and intervention through DHIS2 system posed challenge in determination of healthcare providers performance (Bello et al., 2021). Potential health care systemic challenges mostly amount to unfavourable work environment which doesn't favour productivity and performance of healthcare workers. In some of the nations challenged by the shortages of health care workforce, the available healthcare workers are equally overwhelmed with workload and eventually demotivated as well - demoralizing work conditions mostly include lack of equipment and supplies and inadequate safety measures adopted (Cancedda et al., 2015). How workload is organized partly may include allocating staff that might be accompanied with overstaffing or understaffing, regulation and division of labour between cadres that increase productivity among the workers (WHO, 2016). The electronic health records systems technically enhance quality of care, promote good treatment, save money on medical expenses and enhance clinical judgment (WHO, 2020). However, despite the fact that electronic health records have advantages like improving performance, utilization may present detrimental impact on clinical workers or healthcare professional directly or indirectly if full comprehensive assessment and risk mitigation measures are not adopted.

Even though there are many convincing merits of established electronic health records systems, South Sudan public health institutions continue utilizing the outdated healthcare data management methods, this carries consequential issues that affect performance and services provision and these includes missing patient records, duplicate medical information, and inefficient use of staff time (Bello et al., 2021). Hence, this study provides comprehension basis on the challenges associated with electronic health records system adoption on the performance of health care professionals. This study therefore, examined influence of electronic health records on the performance of healthcare providers at public health facilities in South Sudan.

1.4 Objectives of the study

1.4.1 Main Objective

The main objective of this study was to analyse influence of electronic health records on the performance of healthcare providers in public healthcare facilities in South Sudan.

1.4.2 Specific Objectives

  i.   To analyze system quality influence on the performance of healthcare providers at Public Healthcare Facilities in South Sudan

  ii.   To determine record quality influence on the performance of healthcare providers at Public Healthcare Facilities in South Sudan

  iii.   To establish service quality influence on the performance of healthcare providers at Public Healthcare Facilities in South Sudan

  iv.   To analyze knowledge quality influence on the performance of healthcare providers at Public Healthcare Facilities in South Sudan

1.5 Research Questions

  i).   To what extent does system quality influence performance of healthcare providers in Public Healthcare Facilities in South Sudan?

  ii).   To what extent does records quality influence performance of healthcare providers in Public Healthcare Facilities in South Sudan?

  iii).   To what extent does service quality influence performance of healthcare providers in Public Healthcare Facilities in South Sudan?

  iv).   To what extent does knowledge quality influence performance of healthcare providers at Public Healthcare Facilities in South Sudan?

1.6 Justification of the study

South Sudan, like many developing countries, faces significant challenges in healthcare delivery. The implementation of Electronic Health Records (EHRs) has the potential to enhance the efficiency and quality of healthcare services, which lead to better patient outcomes. South Sudan is characterized by limited resources, including healthcare infrastructure and personnel. In assessing the impact of EHRs on healthcare provider performance, the study will provide insights into optimizing the use of available resources, potentially reducing costs and improving resource allocation. EHRs have become a global trend in healthcare. Understanding how it affects healthcare providers in South Sudan will contribute to the country's alignment with international health standards and best practices. EHRs would generate large amounts of data. Analyzing influence of electronic health records on the performance of healthcare providers can shed light on whether data-driven decision-making is becoming more effective and efficient. EHRs have the potential to improve the quality of care by reducing errors, streamlining communication, and providing instant access to patient information. The study determined whether healthcare providers are delivering better care as a result. The findings of this study will inform healthcare policies and strategies in South Sudan. It will guide the government in making informed decisions regarding EHR adoption, investment in healthcare technology, and workforce training. In assessing the impact of EHRs on provider performance, the study indirectly addresses the well-being and health of the South Sudanese population. EHRs were found to have a positive influence on healthcare provider performance, it encourages further investment in training and capacity-building programs, which could have long-term benefits for the healthcare workforce.

1.7 Limitations of the study

During the time of study interventions implementation, occasionally, there were some challenges faced especially at the primary phases of data gathering including pretesting where

some of the participants were unwilling to engage and participate thus prolonged approaching and identifying eligible participants who could consent to participates in the study data collection through filling self-administered questionnaire interviews. Before data collection, eligible participants were provided with the letter of introduction from Kenya Methodist University-SERC to assure them that information to be gathered is purposed for academic fulfilment and would be kept with the highest secrecy and confidentiality as well gave those eligible participants an autonomy since basic information regarding the purpose, risks and benefits of the research were vividly explored for decision making either to accept or decline involvement in the questionnaire interviews. In addition, ethical clearance letter from the National Ministry of Health (MOH) Research Review Board (RERB), an equivalent to Kenya National Commission for Science, Technology, and Innovation (NACOSTI) was provided to the interviewees to legitimatize the study. Due to the busy nature of work at Juba Teaching and Referral Hospital, some respondents were lost. However, to mitigate lost rate among potential eligible participants, the interviewer proposed to Juba Teaching and Referral Hospital management to allocate specific time period for the interviewees, those particular staff selected to fill questionnaire tools. The proposed time to complete the study was restricted, this poised a challenge; in order to complete questionnaire tools on time, the interviewer assured solid time management abilities, made questionnaire tools simple, precise, straightforward and unambiguous to ease comprehension and hence completion within the specified time.

1.8 Delimitations of the Study

Mainly, this study investigated the influence of electronic health records on the performance of healthcare providers in public health facilities in South Sudan specifically implemented in Juba Teaching and Referral Hospital, Juba County, Central Equatorial State, South Sudan. This study sought to establish how system quality, record quality, service quality and

knowledge quality influenced the performance of healthcare providers. The outcomes of this study were generalizable to all public hospitals in South Sudan.

1.9 Significance of the study

A number of surveys or studies were carried out on health challenges in South Sudan, and despite all these efforts, there is very limited literature on influence of electronic health records on the performance among healthcare workforce. The researcher of this study aimed of creating blueprint from the conclusive results which are valuable to the government institutions, donor agencies and project managers contributing towards promoting quality and standards of the electronic health records (EHRs) systems in public healthcare sector of South Sudan. This research provided recommendations which can resolve the setbacks related to lack of functional EHRs systems instead a full manual system utilized, hence, implementation and adoption of the EHRs systems in the public hospitals or facilities with South Sudan will realized performance and satisfaction among the patients because of information management support. As the government progresses toward efficient and effective health service delivery, the findings of this study might be utilized to understand issues around utilization and significance of electronic health records systems as well as formulation of public policies that are just to promote adoption and utilization that can contribute towards performance improvement among health care professionals and this consequently strengthens service delivery at public health facilities in the country as South Sudan.

In fact, Ministry of Health for the government of South Sudan is a great beneficent of this study, generally the study outcomes provided electronic health records framework that Ministry of Health might put in efforts to adopt and operate electronic health records systems in public health facilities nationwide. The Ministry of Health managerial and leadership body

efforts to implement strategies on the use electronic health records would address performance issues among healthcare providers in public health facilities.

There is also a great value this study carries for project managers involved in the implementation and adoption of EHRs systems projects within government owned healthcare facilities. The findings will help in exposing critical factors that are hindrance towards a successful adoption of EHRs systems within the public healthcare facilities or hospitals within South Sudan. The recommendations will assist in filling up loopholes with the aim of promoting effectiveness and efficiency of the EHRs within the public healthcare hospitals units.

Besides, the obtained results from this study intervention will embody existing literature on EHRs within the public healthcare facilities of South Sudan. Therefore, researchers in future will develop research papers against or agreeing with this study as an empirical evidence on the influencing factors of electronic health records on the performance of healthcare providers in public health facilities generalizable within South Sudan or countries with similar contextual setups. In addition, the study will stimulate interests amongst scholars helping them formulate research conceptual papers through suggesting possible areas for further research of EHRs within different national or international arenas of the public healthcare sector.

1.10 Assumptions of the Study

i). The sample was a representative of whole targeted population.

ii). Information requested by the study was accurately given by the respondents.

iii). Results emanating from the study were representative and generalizable to all public healthcare facilities in South Sudan.

1.11 Definition of Terms

Electronic Health

Records (EHR):
Refer to individual patient's health information that is gathered, created and managed by healthcare workers in a health facility in a computer system and can be easily shared among authorized health workers and other medical institutions.

Health Information System (HIS):
A health system strengthening pillar that deals with integrated health data system.

Information Communication technology (ICT):
It's a set of technical tools and resources in a computerized version used to create, communicate, distribute, store and information management.

Information technology (IT):
It's the scientific study that involves information support, information management, information development, design and information use.

Public Health Facilities:
Refer to healthcare institutions within a given population that provide healthcare services.

Performance of Healthcare Providers:
Refer to individual performance outputs determined by production, system and

satisfaction.

Knowledge Quality: Refer to knowledge, skills or competencies and its application at work.

Record Quality: It is the degree to which a computerized records system fulfills set of inherent characteristics requirements.

System Quality: Ability to organized activities of an organization to production objective, transforms the various organization inputs to useful outputs, operate within other organization system and ensure feedback about the activities to improve organization performance.

Service Quality: Refer to patient outcomes, technical support and the IT knowhow.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter explored research variables of the influencing factors of electronic health records (EHRs) system adoption on the performance of healthcare providers in Juba teaching and referral hospital through literature reviews that provided theoretical foundation. Specifically, the coverage components of literature reviewed were on: EHRs systems and adoption or implementation, system quality, record quality, service quality, knowledge quality and their influences on the performance among healthcare professionals within the public health care facilities or units. Theoretical framework, conceptual framework and research gaps were thoroughly explored in light of the influencing factors of EHRs on the performance of health workforce within public health sector setup.

2.2 Influence of Electronic Health Records on the Performance of Healthcare Providers

In the absence of a reliable data on the influencing factors of electronic health records on healthcare services provision in public health sector institutions, quality of care challenges emerged (Hakkinen et al., 2013). Consequentially, the most likely immediate influence concerning this challenge is majorly the paucity of trustworthy information on healthcare provider quality services, despite the fact that such information is required to inform both public and individual decisional perspectives towards health improvement. As a result, recent changes to medical finance and health plan options place a strong emphasis on increasing competition and efficiency in the healthcare sector (Van der Wees et al., 2014). Although cost and clinical expenditures have a demonstrable impact on these improvements, quality is becoming a cause for the worry (Webber et al., 2013). A few techniques for gauging and monitoring the calibre of treatment and service delivery include the use of performance indicators and outcome evaluation; creating and publishing indicators has also resulted in quality improvements in several nations.

Several studies examined healthcare system indicators especially dimensions of design and implementation (Brand et al., 2019). A qualitative data issues produced undesirable cause; firstly, the health care providers struggle to get appropriate data which is frequently based on the patient outcomes and the quality evaluation that included the clinical care quality outcomes, services and care processes (Lown & Manning, 2020). The third challenge in evaluating healthcare quality is the restricted number of patients for research and many variables other than provider quality that affect health service quality. Finally, orientation and bias might impair patient treatment and performance of the healthcare professionals. In essence, systematic patient differences can cause trends that affect HER samong the healthcare providers.

These problems have limited the relevance of specific information on healthcare quality, especially major health consequences (Shahian & Normand, 2018). Unfortunately, there is no published research that evaluates influencing factors of EHRs on the performance of healthcare providers since no universally accepted metrics have been identified. It seems that the best strategy to evaluate providers is to examine how their healthcare services influence clinical outcomes and patient satisfaction. Each nation has designed and implemented indicators that match its circumstances. An overview of all reported indicators may assist achieve the aforementioned aim by relying on each and every nation's experiences and indicators.

In Shukri and Ramli (2015), the results of evaluation for the variables influencing the Malaysian healthcare practitioners where 97 Association of Private Hospitals Malaysia-registered private hospitals were surveyed using a standardized questionnaire, 40.2% of 39 answers were usable and relative to this study objective. In the descriptive summative findings, it was revealed that the most Balanced Scorecard used in the private hospitals were extremely centralized and codified. The administration and governance of these private

hospitals followed defined norms and documented processes to upholds internal business procedures, patient quality, safety and satisfaction as well organizational learning and growth and additionally the financial performance improvement. Even though this study has a proof on responsible healthcare professionals, performance drivers may include responsibility, honesty, accountability and openness as applied among the healthcare providers. The survey found that healthcare employees in Malaysia prioritized safety and happiness, organizational learning and development as well as financial stability.

2.2.1 System Quality Influence

In the Salyers et al. (2017), purpose was to determine a relationship that exist between system quality and performance of healthcare professionals in the North Ireland. The method employed was structured questionnaires to gather information from the healthcare professionals working within the public health facilities. In order to provide collaboratively focused healthcare, influenceive professional networks make use of intrinsic structural network components (such as bridges, brokers, density and centrality as well as the degrees of separation, social capital and trust). The research demonstrated influenceive information transmission and social and professional engagement across networks. The research found that system quality substantially influenced healthcare providers within public health institutions of North Ireland.

As narrated in Cunningham et al. (2018), the influence of the system quality in improving healthcare quality and the performance of healthcare workforce in Greece, methodology employed was questionnaire for gathering data from the location of the study. This research found that system quality influenced healthcare provider behaviour to improve care and provider-patient transparency. A high-quality support services further boost clinical staff

performance and satisfaction. The research found that system quality greatly enhanced healthcare quality and healthcare worker performance within Greece.

Tilahun and Fritz. (2015) study carried out on the influencing factors of system quality on the performance of health care providers within South Africa. The subjective targeted audience were the medical staff assigned within public healthcare facilities within the suburbs of Johannesburg City. According to the study, the frequency of technical support visits enhanced both physicians' ability to use an EHR system and the quality of work performed. This study found that influenceiveness of healthcare providers is positively influenced by the system quality.

Bossen et al. (2013) a study performed on the influences of system quality on the performance of healthcare professionals within UK. The sample size of this study was 172 healthcare service providers, data analysis was passed through coding and analytic tools utilizing SPSS applications. Descriptive statistics were used in analysing the data. According to the report, EHRS have the potential to significantly benefit medical professionals, clinic settings, and healthcare organizations. The research found that the performance of healthcare professionals and the efficient usage of EHR systems were both positively influenced by the service quality.

2.2.2 Record Quality

In the Chang et al. (2021), a study carried out on the influences of record quality on the performance of healthcare professionals within china. The investigated healthcare providers constituted the targeted population. The research discovered that implementing critical care systems decreased documentation time taken and increased an EHRs systems quality and access time, favourably influencing EHRs system adoption among physicians as well the supporting staff. The similar findings were made by doctors working in critical care units,

who discovered that using EHRs systems leads to less time being spent on clinical evaluation and documentation works. Therefore, in the conclusion, a record quality had a large and favourable influence on the performance of Chinese healthcare practitioners.

On the facts from Zegers et al. (2019) study, conducted on the influences of the record quality influence on the performance of healthcare providers within Serbia. The study sample was comprising of 213 eligible participants, the raw data gathered passed through statistical tools and the data tool used was a structured questionnaire. According to the findings of the research obtained, the majority of quality assessment methods for paper-based medical records put an emphasis on data format and compliance with legislation. This may not be appropriate and good enough for determining the quality of an EMR. The study concluded that record quality significantly influenced the performance of healthcare providers in Serbia.

Rasmi et al. (2018) conducted a study on the healthcare professionals' acceptance to the electronic health records (EHRs) within the Jordan health sector. The evaluation determined that the electronic health records (EHRs) system was designed to assess hospital quality, minimize medical mistake and associated problems as well as lowered healthcare expenditures among the patients and the facilities. The antecedent elements influencing healthcare workers' intents to adopt an EHR system, however, had not been well studied. A theoretical model is put out to explain why healthcare workers adopt an EHR system, based on trust considerations merged with the UTAUT2 paradigm. I the study lead conclusions, the Jordanian health sector benefited from the healthcare professionals' embrace and adoption of the electronic health records systems.

Within Ayanlade (2018) study that evaluated the role of electronic medical record quality as a central ICT tool for quality healthcare services provision and improved performance of health care workforce within Nigeria. The researcher found that there were dangers associate with

EMRs adoption and implementation in the Nigerian health sector as well as how both the staff and patients perceived the outcomes. It was further discovered the hospitals situated within the locality of the research region were continuing to deploy or interoperate the manual records system hence faced a numerous challenge that included time wastage that kept patients waiting longer to access care and therefore became very annoying to both patients and care givers and frustrating during the emergency situations. The research also pointed out in the conclusion that the performance of health care professionals in Nigeria had greatly increased due to the utilization of the quality Electronic Medical Records (EMRs), a key ICT tool for ascertaining a high-quality healthcare services within the healthcare sector.

2.2.3 Service Quality

Salleh et al. (2016) study was conducted on the influence of system quality factors on health care professionals' performance within Malaysia. This study primary subjects were healthcare staff members within public health institutions. According to the research, EHRs was a condensed version of the patient medical data gathered from their medication records after care rendered. Additionally, it was shown that medical professionals performance efficiency increased while maintaining quality via wise clinical judgments. The research pointed out in the conclusion that Malaysia's health care professionals perform considerably and favourably as a result of system quality attributes.

Kumarapperuma et al. (2022) study carried out on influences of the service quality on the performance of healthcare providers within Wales. This research methodology used was structured questionnaires and interview guides to formulate hypothetic data for the study. The research concluded that high-quality service was more prevalent in our practices and institutions, that it would enhance clinical outcomes and patient and physician satisfaction while decreasing costs, and that it would generate a competitive edge for those skilled in its

implementation. The study concluded that service quality significantly influenced performance of healthcare providers in Wales.

In accordance with Wanjau et al. (2012) study carried out on influence of service quality on performance of healthcare providers in Kenya. The method of gathering data applied was structured questionnaire. The study used drop and pick later approach. According to this particular research, inadequate technology adoption in health service delivery resulted in a factor of 0.917 drop in the efficacy of EHRS, while insufficient staff capacity resulted in a factor of 0.981 decline in the performance of the health workers sector. The study concluded that service quality significantly influenced the performance of healthcare providers in Kenya.

Draiko et al. (2019) conducted a study on the influences of service quality on performance of healthcare providers in White Nile state, Sudan. The field data was collected through use of structured questionnaire tools. The descriptive and inferential statistics were analysed from the data sustained. The manipulation results were including the tables and figures to interpret and give meaning to the results. The adoption and usage of EHRs systems in public hospitals increased level of capacity, training which represented a significant increase in knowledge, skills and competency in neonatal resuscitation. The study concluded that service quality significantly influenced the performance of healthcare providers in the White Nile state of Sudan.

2.2.4 Knowledge Quality Influence

Ameh et al. (2016) studied the influence of knowledge quality and related skills on health care professionals' performance in the Sub Saharan African nationalities before and after the competency-based capacity building trainings were provided. Ghana, Kenya, Malawi, Nigeria, Sierra Leone, Tanzania and Zimbabwe a few among the countries that the

evaluations were performed in. EHRs combine patient health information to avoid medical mistakes and facilitates statistical analysis, display and use. According to the study's findings, knowledge quality positively influence how well EHRs systems are utilized and this in return affects how well healthcare practitioners perform their works.

Pineda-Antunez et al. (2021) studied the Influence of Knowledge quality on the performance of the healthcare providers. The medical knowledge is developed from the tacit skills, which mostly relates to healthcare practitioners' experiences or professional practices, and then ordinarily expressed in terms of explicit documented outputs like the EHRs, CPGs or medical or clinical procedures. An EHRs systems creates, stores and organizes EHRs, CPGs or the clinical workflow including information, improving knowledge quality through precise clinical judgments and increased clinician job productivity within the healthcare setup. The research found that knowledge quality has a substantial and advantageous influences on health care professionals' performance.

Ibikunle et al. (2021) performed a study on the performance of health care professionals in relation to knowledge within the primary healthcare facilities in Nigeria, Lagos. This study was cross-sectional study with eligible participants of 391 nurses and midwives who offered prenatal nutritional education and willingly filled out the self-administered questionnaires which basically covered crucial information on their level of nutritional awareness and knowledge. The statistical analytical software utilized was EPi-Info version 3.5. In order to identify the contributing elements and predictors of nutrition knowledge, inferential techniques like chi square and multiple logistic regression were applied. The research found that primary health care facilities within Lagos, Nigeria performed better when health care practitioners had high knowledge quality.

Babiker et al. (2014) carried out study on influence of knowledge quality in relation to health care professional development and performance in Sudan. Due to rising co-morbidities and care specialization, influenceive teams were highly needed, based on the findings of the research, the established doctors, dentists, and other health practitioners in any health organization can no longer provide excellent treatment that satisfies people. The research stated that EHRs systems will evolve healthcare system globally if there are excellent health care services which move along with health workforce professional growth with strong emphasis on patient emphasized cooperation. The research found that information quality is key and positively affected Sudanese health care professional growth and performance.

2.3 Theoretical Framework
2.3.1 Technology Acceptance Model (TAM)

This model was literally formulated, coined or popularized by Davis and Venkatesh (1996) results were exclusively expanded with the aim of giving a detailed component in Reasoned Action Theory (TRA) that discussed on EHRs, utilization, compelling influences and latent consequences on the performance. Based on provisional accounts provided within the work of Fishbein and Ajzen (1975), this theory originally aimed at explaining convincing reasons on the fact behind users of a system basically readily accept or reject certain elements of the system components. In the other study performed by Davis and Venkatesh (1996), the components studied were including the system users' attitude and termed it as a mediating factor that can be removed as the empirical evidence showed the element of attitude failed to mediate the influence of system usefulness perceived on the intent to use. The theory was involved in the prediction of the acceptance of the information system and further detect challenges that might arise within the EHRs systems at a point before the system will be released for use by the staff. The acceptance of the EHRs systems to the users through application of the model provisions will establish the usefulness perceived by the users and

the use with ease. The degree to which the users of the system have a believe that involves a system consideration within their operations can positively influence performance among the workers. The perceived ease of using a system literally refers to a believe among the users that a system only requires little commitment unlike the manual system that have convoluted elements in fulfilling data management activities. Hence, the ease of the use will influence attitude towards EHRs systems as favourable or satisfactory among the users. This theory is definitely relevant to the study as the perceived usefulness of EHRs systems and their ease to use or interoperate directly or indirectly influences the quality of the system outputs on promoting the performance of the healthcare professionals in the case of public healthcare sector.

2.3.2 Values Engaged Evaluation Theory (VEE)

Like the other theories discussed in this research, Values Engaged Evaluation (VEE) theory was one of the reviewed ones, VEE was developed and popularized by Greene et al. (2011), originally, it was an independent approach that put much considerations on the organizational stakeholder characteristics pertaining to values and context of the organization or a company. This theory aims were concentrated on pertinent compressive comprehension of the contexts under which the programs embedded, the under exploited resources and the underserved service takers. In essence, VEE offers were three aspects regarding the stakeholder values and these included pragmatism, emancipatory and deliberative which generally implied that the system considers all interests, increases the chances of use and that it empowers all the stakeholders involved. VEE focuses on responding to in-depth inquiries and best suited for assessments that are summative and formative in approach.

In purview of this particular research, VEE is relevant, it allowed the researcher have opportunity evaluated and analyzed the influencing factors of EHRs on the performance

among healthcare professionals working within public healthcare hospitals or facilities, a case of Juba teaching and referral hospital and provided foundational insights on what has been done so far, how far they are and that the right time and approach to do the implementation and adoption of EHRs. The EHRs systems basically aimed at promoting the data quality, data accuracy, timely reporting as well as promptly access to information from the system. These indicators formed the basis of evaluating whether the installed EHRs system have influences on the performance of the healthcare workers.

2.3.3 Diffusion of Innovation Theory

The birth of this theory was when coined and made popular by Roger (1962). It was originally termed as communication theory envisaged at narration of how the products and ideas gets recognized within a certain population or a society over a period of time. In the final outcome adoption of the idea product or behaviour by the social systems, the outcome literally explains that individuals start doing something in a way different from the existing way of doing the same activity. The individuals must perceive the adoption of a new idea, product behaviour, the product, innovation, behaviour or idea and then the diffusion realized is a possibility. In the agreement with a recommendation that understanding the innovation decision process is crucial to the enhancement of the diffusion of an innovation or technology. The innovation decision process is comprised of five stages; knowledge of the innovation, persuasions of the target users, making decision, implementing the innovation and confirmation stage which ensures the innovation does what it was implemented to do (Rodgers, 2003).

Essentially, this research aimed at establishing the way target users understand the adopted EHRs systems in public health care facilities within South Sudan public health sector and beyond. The tenets of specific theory were utilized to the maximum to ease the understanding

and embraced EHRs and implementation within Juba County public health sector institutions and generalizable to other sector in different contexts. The manner in which top level management of the organization communicates EHRs or implementation or any other related of technological system is a success determinant. The diffusion of the technology in the organization and the consequent successful implementation as well as the usage especially the EHRs system influences performance among the employees as healthcare providers within Juba teaching and referral hospital or Juba County public health institutions at large.

2.3.4 Theory of Planned Behaviour (TPB)

As explained in the Ajzen's Theory of Planned Behavior (TPB), an individual behavioural purpose depends on their attitudes, subjective norms as well as the perceived behavioural controls. In regardless of intention, the behaviours can directly compel or prohibit by the external influencing factors depending on the degree to which behavioural of a person is actually under their own control and the degree to which that specific personal perceived level of behavioural control is an accurate indicator of their actual level of behavioural control. The attitudes concerning EBIP use, teaching and learning are equally key factors considered too. The perceptions and expectations of some other person and the regards people hold onto them are subjective criteria elements that may be social pressures.

The relevance of this theory to the research of the influencing factors of EHRs on the performance of healthcare providers at Juba teaching and referral hospital critically come out clear in the issue of the developed behaviour among the healthcare professionals or staff within Juba County public health facilities. The developed behaviour is dependent on the EHRs, operations and planning aspects within the facilities, that the anticipated influences in the use of EHRs systems, creation and application of knowledge learnt in promoting their performance.

2.4 Conceptual Framework

The interrelationship that prevails in between different study variables were demonstrated in the conceptual framework (Mugenda & Mugenda, 2009). The graphic shows influence of independent variables on dependent variable – it clearly displays independent and dependent factors correlational aspect.

Figure 2.1:

Conceptual Framework

Independent Variables

Dependent Variable

System Quality
- IT infrastructure
- System interoperability
- Perceived security concern
- Compatibility of EHR

Record Quality
- Timely access
- Consistency,
- Standardization
- Accuracy/completeness

Performance of Healthcare Providers
- Productivity
- Skills
- Education & training

Service Quality
- Technical support
- Internal IT personnel
- Influence use
- Patient outcomes

Knowledge Quality
- Learning efficiency
- Creation of new knowledge
- Application of Knowledge
- Needs and values

2.5 Research Gap

Likely all of the studies reviewed contextually and theoretically provided threshold base for this research, the influencing factors of electronic health records on the performance of healthcare providers in public health facilities in South Sudan, a case of Juba Teaching and Referral Hospital. These studies were geographically and contextually featuring developed countries compared to South Sudan, a country that is yet to establish development fundamentals including health sector. Therefore, this has created a contextual gap for this research. This study aimed at the influencing factors of electronic health records on the performance of healthcare providers within the public health facilities within Juba County, South Sudan. To emphasize on the contextual gap, the studies reviewed and countries of implementation were: Salyers et al. (2017) conducted in North Ireland; Cunningham et al. (2018) in Greece; Tilahun and Fritz. (2015) in South Africa; Bossen et al. (2013) in UK; Salleh et al. (2016) in Malaysia; Kumarapperuma et al. (2022) in wales; Wanjau et al. (2012) in Kenya; Ibikunle et al.(2021) in Nigeria. Similarly, South Sudan one of the world youngest countries which is trolling with developmental agendas to likely establish and develop various sectors of the economy including the health sector. No study has been done in South Sudan regarding the influences of electronic health records on the performance of healthcare professionals in public health facilities and therefore it is against this background the study looked at the influencing factors of electronic health records on the performance of healthcare providers in public health facilities of South Sudan**.**

2.6 Summary of literature review

Existing literature reviewed did not conclusively established influence of electronic health records on the performance of healthcare providers in South Sudan. However, the literature revealed several possible issues that could influence performance of healthcare providers, for instance, system quality factors; record quality factors; service quality factors and knowledge

quality factors. Electronic health records systems lack value if not used properly by the healthcare providers. Electronic health record system adoption and implementation is a continuous process of data collection, analysis and information sharing that provide a way in which disease trends establish basis of monitoring, treatment and mitigation. Again, some of the studies which were available and reviewed were out dated and operationalized within contexts that might not be similar to those within the context of this study, South Sudan.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter detailed methods researcher applied during the study activity undertakings as well as the protocols followed in fulfilling the purpose of the research. Specifically, this chapter covered research design, target population, location of the study, sampling, preparation of data collection instruments/instrumentation, data collection procedures and methods of data analysis.

3.2 Research design

This research study employed descriptive cross-sectional study design using both quantitative and qualitative methods. Typically, descriptive cross-sectional entails procedure of realizing raw data provided by the participants of the study through filled both open-ended and closed questions of the questionnaire tool that aimed at describing particular features common in the target population organizations, elements, individuals and objects (Kothari, 2014).

3.3 Target Population

The target population is the group of individuals that the intervention intends to conduct research in and draw conclusions from (Macfarlane, 1996) In this study, targeted population was comprised of 226 individual healthcare professionals. This population was chosen because all individuals included possessed similar elements or similar observable characteristics of interest to the study. These healthcare providers were comprised of hospital administrators, pharmacists, technologists, doctors, clinical officers and nurses. For the sake of manageability, the study focused on Juba Teaching and Referral Hospital.

Table 3.1:

Target Population

Category	Population	Percentage (%)
Hospital Administrators	13	6
Pharmacists	17	8
Technologists	11	5
Doctors	23	10
Clinical officers	21	9
Nurses	141	62
Total	**226**	**100**

3.4 Location of the Study

The area of the study was Juba County in Central Equatoria State. Juba Township is largest in Central Equatoria State headed by a commissioner and serves as the National Capital City of the Republic of South Sudan. Juba County borders Torit County on Eastern side, Terekeka County Western Side, Yei County Southern Side and Magalla County Northern Side. Juba is comprised of 3 sub-counties (Payams) namely Juba Town Payam, Kator Payam and Munuki Payam and its population estimate is 568,900 persons according to the national population surveys 2021. Juba County primely hosts Juba teaching and referral hospital that falls in tier 1 of South Sudan health system hierarchy of 3 tiers namely: Primary Health Care Units (PHCU), Primary Health Care Centers (PHCC) and Hospitals (exist either State, County, Police or Military). This order is in accordance with community, primary, secondary and tertiary levels. Juba teaching and referral hospital is a government owned hospital with a 580-bed capacity and the only functional ultimate referral hospital in the whole of the Republic of South Sudan. The number of estimate staff working in Juba teaching and referral hospital is 226 healthcare professionals. Juba teaching and referral hospital has partially implemented EHRs system and most of the health care providers employed have likely used EHRs systems though most of the departments are using manual records system. Juba county has two different EHRs systems including MRS and HMIS used in some public health facilities outpatients only.

3.5 Sample Size and Sampling Technique

A sampling refers to a process of picking subset from a larger population of the study so that the results may be extended to the entire population. Sampling may be done in both probabilistic and non-probabilistic approaches. All persons and components under evaluation have equal odds of being evaluated under probabilistic criteria, whereas in a non-probabilistic method, inclusion and exclusion procedures are clearly defined. This study employed the random sampling approach where all the elements had equal chances of being chosen. The sample size was realized by applying the formula Yamane (1967).

$$n = \frac{N}{1 + N(e)^2}$$

Where: N = Population size

n = sample size

e = Margin error of the study

Sample size therefore was;

$$= \frac{226}{1+226(0.05)^2} = \frac{226}{1+226(0.0025)} = \frac{226}{1+0.565} = \frac{226}{1.565} = \mathbf{145} \text{ which is } 64\% \text{ of the target population.}$$

Table 3.2:

Sample Size

Category	Population (N)	Sample (n) (64% of N)
Hospital Administrators	13	9
Pharmacists	17	11
Technologists	11	7
Doctors	23	15
Clinical officers	21	13
Nurses	141	90
Total	**226**	**145**

3.6 Instrumentation

An unstructured self-administered questionnaire was utilized in collecting the necessary data from the eligible participants of the study and purposed at fulfilling the ultimate goal of the study. The contents were a closed-and an open-ended query as well a 5-point Likert Scale Statement. The instruments contained five parts. Part A to E. Part A asked about the primarily details of the eligible participants including demographics with objective of screening participants through confirming their eligibility details on participation in the study and condition of electronic health records rating among healthcare providers. Parts B to E were on the study variables.

3.7 Pre-test

In the process of developing study questionnaire, pretesting was a major start up step on determining and sustaining internal consistency as well as structuring convenience of the study tool and agrees with (Kothari, 2014). A pretesting was conducted in Giada Military Hospital. This hospital had features matched with the ones of Juba Teaching and Referral Hospital, the area of the study. The 20 respondents were randomly selected and interviewed. The common features of Giada Military Hospital are: A Military owned; falls in Tier 1 of South Sudan Health System Hierarchy; a 500-bed capacity hospital; has over 100 health professionals employed; partially implements Open MRS and DHIS2 system and located within Juba County, the Capital of the Republic of South Sudan.

3.8.1 Reliability of Research Instruments

This majorly focused on whether the study tools would produce similar results when filled a number of times on the same subject matter under similar conditions. The research tools were tested for reliability by subjecting some of them to some subjects with similar characteristics as that of the target population but were not part of the sample studied. The data collected for reliability testing was performed at least twice and the level of correlation between parallel

forms was also tested. For assessing reliability, the Cronbach alpha coefficient was used. According to Sekaran and Bougie (2016), the Cronbach Alpha coefficient ranges from 0 to 1 and if equal or greater than 0.7, then the outcomes of the study are normally deemed fit for generalization to a larger population.

3.8.2 Validity of Research Instruments

As argued in Vincent et al. (2019), the validity evaluates whether a research can measure its objectives that it was likely designed to achieved as well as tests accuracy of its statistical outcomes. In this study, the researcher envisaged at pretesting to ascertain contents of the study and assures construct validity. In this regard therefore, the study instrument examined the relationship between the two research variables primarily known as the content validity and the construct validity which is known as an amount the instrument adapt to theoretical concepts supposed to evaluates. In reference to this narrative on the validity, the researcher utilized pretesting to determine validity of the study data tools and scores of testing periods were found having correlational efficient (r) and p-value of <0.5 deemed statistically significant.

3.9 Data Collection procedure

The study data gathering tools were structured questionnaire tools for health care professionals working in public healthcare facilities in South Sudan. These instruments were self-administered. These questionnaire tools were distributed to the eligible participants who filled them after approval of the consent forms. The study used drop and pick later approach as used in a study by Wanjau et al. (2012). The researcher was able grant a respondent (s) with an additional week to finish the questionnaire (s) for the case of some respondent (s) unable to complete the survey (s) within the day or first week(s) of the survey that took approximately three weeks passed between the data gathering and cleaning procedures. This

was allowed to give enough time to gather accurate quality data for the statistical analysis and reporting.

3.10 Methods of Data Analysis

Statistical analysis was done through application of Statistical Package for Social Sciences (SPSS) v25, use of mean and standard deviations to determine measurement of central tendency of a dataset where mean score was utilized and standard deviation measures variability or spread of data around the mean. Qualitative data was analysed through thematic analysis that involved analysis of the content of the questionnaire tool (transcriptions) line by line to identify patterns that provided meanings which were categorized into themes that were coded with objective to provide an insight on how else does electronic health records promote performance of healthcare workers in public hospitals / health facilities in South Sudan.

For data quality management measures, a raw data realized from the field was passed though phases of sorting, cleaning, coding, editing, entering and ultimately manipulated through application of the Statistical Package for Social Sciences (SPSS) version 25.0. A few of the descriptive outputs were also utilized and included percentiles, means and lastly but not least standard deviations. The generated results presentation was done using the formats including the figures and tables completed in prose. The responses from open-ended questions from the filled self-administered questionnaires were thematically presented in prose as primarily guided by the study objectives. Furthermore, the Pearson correlations application was adopted to evaluate associational strength that exist between different study variables. Finally, multiple regressions were run to find out a collective predictive power of the independent factors on the dependent factors. The model adopted to demonstrates relationship between independent and dependent variables of the study was, $\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$

Where: -

Y = Performance of Healthcare Providers

X_1 = System Quality

X_2= Record Quality

X_3 = Service Quality

X_4 = Knowledge Quality

While $\beta_1, \beta_2, \beta_3$ and β_4 are coefficients of determination and ε is the error term.

3.11 Ethical Considerations

The researcher sought an approval from the Kenya Methodist University (KeMU) through its Science and Ethical Review committee (SERC) and Ministry of Health (MOH) Research Review Board (RERB) for the government of the Republic of South Sudan, an equivalent to the Kenya National Commission for Science and Technology innovation (NACOSTI). An introductory letter was provided to the researcher to primary introduce the study to the potential respondents with the objective of citing to them that this research is purely an academic research and any information they would give will be used for academic purposes only. Furthermore, the researcher made the participants aware that participating in data collection process was purely voluntary and they had a right to withdraw/decline their participation anytime during the process. No one coerced the participants to take part in the study. The study required the respondents to fill consent form before making a choice to take part in the study or not – assures autonomy of the respondents. Finally, the study guaranteed the confidentiality and privacy of the respondents by observing the principles of anonymity.

CHAPTER FOUR
RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter entailed the study statistical outcomes from the questionnaire data completed during the study data procedure undertaken and objectively narrative of the study objective variables. To maximize data quality assurance, data collected was passed through the data quality management phases of clean up, reduction, differentiation and expansion while editing, coding and tabulating adhered to detect any errors. The data entering and analysis procedures were performed by the researcher through utilization of the Statistical Package for the Social Sciences (SPSS) version 25 where correct variable specifications and codes were verified for any inaccurate entries. The descriptive statistics comprising of mean, mode, median as well as standard deviations were the primary statistical analytics for obtaining analytical tables, figures and charts. The presentation of the results and interpretations were completed in prose.

4.2 Response Rate

This study investigated 145 health care professionals who were working with Juba teaching and referral hospital, South Sudan. In the matter of unavoidable inconveniences, from 145 participants, only 127 completed the interviews, proportional to 87.6%. In the Mugenda and Mugenda. (2009), a response rate from 50% and over is sufficient for statistical analytics, a response rate from 60% above is good and the one from 70% above is excellent. Therefore, this means this study response rate of 87.6% was excellent for the statistical analysis whose results were generalizable.

Table 4.3:

Response Rate

	Frequency (N)	Percentage (%)
Completed questionnaires	127	87.6
Uncompleted questionnaires	18	12.4
Total	**145**	**100.0**

4.3 Pre-test Results

A pre-test was carried out on 20 hospital healthcare professionals working at the Giada Military Hospital with the aim of testing reliability of the study instruments. The healthcare professionals employed in this particular hospital had similar observale characteristics that matched dynamics of health cadres employed within Juba Teaching & Referral Hospital. The issue of internal consistency was achieved through the application of Cronbach's alpha. Through pre-test results, the variables possessed alpha coefficient of 0.759. This literally meant that those particular variables have high internal consistency hence the tools adopted were good since any reliability coefficient above .70 is termed sufficient for the analysis and reporting.

Table 4.4:

Summarized Cronbach's Coefficients

	Cronbach's Alpha	N of Items	Conclusion
System Quality	0.781	8	scale reliable
Record Quality	0.756	7	scale reliable
Service Quality	0.744	7	scale reliable
Knowledge Quality	0.751	9	scale reliable
Performance of Healthcare Providers	0.764	9	
Overall	**0.759**	**40**	**Instrument reliable**

4.4 Demographic Information

The researcher aimed at determining demographic details of the participants, profoundly act as part of eligibility screener determining participation status in the study activities. The primary information sought were the gender, age, education and period worked at Juba Teaching and Referral Hospital in South Sudan. The background information of the eligible participants and the established gender dynamics, results revealed females were the majority respondents 76 (60%) and males minority with 51(40%). The outcomes informed that many healthcare professionals working within Juba Teaching and Referral Hospital during this study activity implementation were females. This suggest that Human Resources for Health (HRH) manual prioritized selection and recruitment of female staff over the opposite sex. This may likely influence electronic health records utilization and subsequently the performance of the workers because use of EHR system or technology is majorly believed to be a profession of males. In the other hand, there some facts associated with sex like gentleness, caring and friendly mannerism during services provision to clients/patients mostly believed women suits.

Also, in the results, most of the participants were between ages 26-35 years 47(37%); and others were ages between 36-45 years 43(34%); ages 25 years and below 27(21%) respectively. This means that majority of the group of health care professionals working at Juba teaching and referral hospital were aged between 26 and 45 years and it is an age group that is at its optimum age, skilled and energetic enough for productivity and focused so much on their personal growth and facility's progress. In addition, as depicted in the table 5 above, the majority of the participants 71(56%) have completed diploma education programme the only highest educational stage, 32 (25%) were first degree holders; 13(10%) had postgraduate level of academic qualification while 11(9%) were certificate holders. The outcomes shown that all the respondents had achieved specific professional training required for the healthcare

professionals or workers depending on their cadre specifics. Therefore, participants competency was ascertained because they were all able understands and responds to queries on the structured questionnaire tools for study on the influencing factors of electronic health records on the performance of the health care professionals in South Sudan, a case of Juba teaching and referral hospital.

Moreover, the results revealed that most of the participants 56(44%) served at the hospital for the period at least between 1-5 years; the 46(36%) had served for 6-10 years; the 16(13%) had served for Less than 1 year while the 9(7%) had served for over 10 years. The results explicitly portray that the respondents had served for 5 years or more and therefore deemed aware of the influencing factors of electronic health records on the performance of health care professionals in South Sudan, specifically in Juba teaching and referral hospital.

Table 4.5:

Demographic Information

Gender	Frequency(N)	Percent (%)
Male	51	40
Female	76	60
Total	**127**	**100**
Age bracket	**Frequency(N)**	**Percent (%)**
25 years and below	27	21
26-35 years	47	37
36-45 years	43	34
Above 45 years	10	8
Total	**127**	**100**
Level of Education	**Frequency(N)**	**Percent(%)**
Certificate level	11	9
Diploma level	71	56
Graduate/Degree	32	25
Postgraduate	13	10

Total		127	100
Duration of service as HCW		**Frequency(N)**	**Percent(%)**
Less than 1 year		16	13
1-5 years		56	44
6-10 years		46	36
Over 10 years		9	7
Total		**127**	**100**

4.5 Condition of EHRs System Rating among Healthcare Providers

The analytic results on the question of the condition of the EHRs system rating among the eligible participants in Juba Teaching and Referral Hospital generalizable to other facilities in South Sudan revealed that the system is not to the standards and seemly shaky in some departments. The response of 54% communicated there was good progress even if all standards were not met hence something to applaud was just an effort to strengthen the system that was highly needed in the hospital. In the responses, those responded moderately, good were 54(43%); those responded poor were 34(27%); those responded very poor were 18(14%); those responded good were 14(11%) and those responded very good were 7(5%) respectively.

Figure 4.2:

Condition of EHRs System Rating among Healthcare Providers
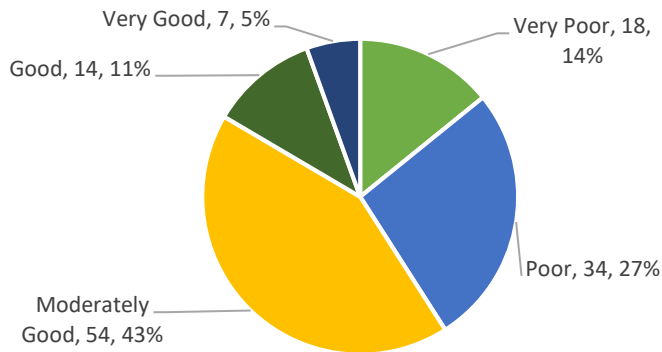
4.6 Performance of Healthcare Providers

For statistical results, respondents revealed that electronic health records influenced performance of healthcare providers through motivation, realization of personal and organisational goals (Mean = 4.6614). Also, some of the participants generally agreed with the fact that an EHRs system promoted storage and accessibility to information on the patient's treatment (Mean=4.6299) and electronic health records system promotes quality of data quality, storage and planning (Mean=4.6220). Moreover, the respondents agreed that time spent per client was greatly reduced (Mean=4.6063) and that the quality of communication between the staff was promoted (Mean=4.4488). There were some other eligible respondents agreed electronic health records improve productivity of health care providers (Mean=3.9370) and promotes healthcare professionals' responsiveness (Mean=3.8976) and lastly, some of the respondents also agreed healthcare providers were satisfied (Mean=3.7323). The results significantly revealed the respondents were cognizant and recognised various factors of electronic health records that influence the performance of healthcare providers in South Sudan.

On thematic analytics of how else does electronic health records promote performance of healthcare providers in public health facilities in South Sudan, responses from the respondents revealed that some of the means were through, effective electronic health records system information flow, electronic health records system utilization and information utilization. Through effective electronic health records system utilization, reports produced helped in the performance reviews that determined achievements of healthcare workers. The identification of weaknesses and strengths helped in the formulation of individual result-based performance action plans inclusive of support from the facility management.

These findings agreed with Hakkinen et al. (2013) that the absence of a reliable data on health care services likely pose challenges including poor quality of care and couple with lack of supportive public policies and healthcare evaluations for adoption and implementation of electronic health records system in public health facilities. The results also agreed with Van der Wees et al. (2014) that electronic health records improve health plan options that place strong emphasis on increasing competition and efficiency in the healthcare sector.

Table 4.6:

Performance of Healthcare Providers

	Mean	Std. Deviation
The workers are motivated to work towards realizing the personal and organisational goals	4.7874	.42965
Quality health services are offered to clients	4.6614	.56653
The EHRs systems promotes the storage and accessibility of patients information	4.6299	.48474
The EHRs promotes the quality of the data stored and available for planning	4.6220	.61630
Time spent per client is greatly reduced	4.6063	.52186
The quality of communication between the staff is promoted	4.4488	.69817
The productivity of the workers is improved	3.9370	1.45705
The EHR promotes the worker's responsiveness	3.8976	1.54218
The workers are satisfied with their work	3.7323	1.24371

4.7 System Quality

For statistical results, responses revealed that respondents agree with the fact that system quality promoted workflow within public health facilities (Mean=4.4882) and that electronic health records promoted security of personal or organisational information stored (Mean=4.4252). Further, the respondents agreed that the information recorded was perceived to be protected and secure (Mean=4.0315) and that there was system interoperability among the various departments within healthcare system (Mean = 3.8425). Furthermore, some of the participants moderately agreed there was update of the system every time new technological innovations were realized (Mean=3.3937); that there was compatibility of electronic health records systems with other systems within the facility (Mean=3.2913) and that the IT infrastructure was streamlined with the physical filing of records (Mean=3.2441). On the other hand, the respondents disagreed that any system failure was corrected immediately (Mean=2.4803). In conclusions, the results proved revealed that healthcare providers in public health facilities were aware of system quality influence on the performance in South Sudan.

Using open ended the study asked the respondents how else does system quality promote performance among healthcare providers in public health facilities in South Sudan, responses from the participants revealed that some of the means were, utilization of health information system at the facility level; logical electronic health records information flow/framework for integrated health data/management/reports and interdepartmental electronic health records interrelations. These provided opportunity where decision making was evidence based and precise that improves performance quality on services provision among healthcare providers. Digital health/HIS operations eased work load among the workers and as well promoted interpersonal/interdepartmental relations through routine informational exchanges or engagements.

These findings agreed with Salyers et al. (2017) that in order to provide collaboratively focused healthcare system, professional networks should make use of intrinsic structural network components such as bridges, brokers, density and centrality as well as degrees of separation, social capital and trust as well also agreed with Cunningham et al. (2018) that high-quality support services boost clinical staff performance and capacity. Furthermore, it agreed with Tilahun and Fritz. (2015) that the frequency of technical support visits will enhance both physicians' ability to use an electronic health records system and work quality outcome.

Table 4.7:

System Quality

	Mean	Std. Deviation
EHRs promotes workflow within health facilities	4.4882	.66507
The EHRs promotes the security of the personal or organisational information stored	4.4252	.52734
The information recorded is perceived to be protected and secure	4.0315	1.14737
There is system interoperability among the various departments within the facilities	3.8425	1.44982
There is update of the system every time new technological innovations are realized	3.3937	1.32232
There is compatibility of EHR systems with other systems within the facilities	3.2913	1.35758
The IT infrastructure is streamlined with the physical filing of records	3.2441	1.34351
Any system failure is corrected immediately	2.4803	1.60777

4.8 Records quality

On statistical analytics, results revealed that electronic health records system was key for a data realized or met the set standards (Mean=4.4882) and that electronic health records

system provide trends of diseases and treatments. In the agreement perspective, the participants revealed that a required accuracy was realized (Mean=4.4488) and that electronic health records system data was relevant in the final accounts' preparations (Mean=4.3937). Moreover, the respondents agreed the data deposited or rather entered or stored in electronic health records systems was in consistent with real time data of the clients (Mean=4.3858) and that there was timeliness in the accessibility or utility requisition of the health data records (Mean=4.3150). Also, these health data records were always complete unlike the physical files (Mean = 3.7953). In summary of these results, the participants/respondents of the questionnaire generally agreed on the fact that records quality influenced performance of healthcare providers in public health facilities in South Sudan.

Using open ended the study asked the respondents how else does records quality promote performance of healthcare providers in public health facilities in South Sudan, responses from the respondents indicated some of the means were through provision of reliable electronic health records/integrated health data, timely accurate and complete health records/data. Information products generated from electronic health records system was reliable, accurate, timely and complete. This provided opportunity among healthcare providers to deliver performance quality in health facilities.

These findings agreed with Chang et al. (2021) that when implementing a critical care system, there is a decreased in documentation time spent and increased on electronic health records quality and accessibility. Additionally, the findings agreed with Rasmi et al. (2018) that the Jordanian health industry benefited from healthcare professionals' electronic health records systems utilization. Further, the findings agreed with Ayanlade (2018) that hospitals in the region that the study was carried out were using a manual system for records keeping and this system was associated with a quiet number of setbacks relative to this kind of records

keeping system and these include workload time consumption by the health care providers, long queues for the patients seeking care services and this makes electronic health records system suitable to improve quality of care in health sector.

Table 4.8:

Records Quality

	Mean	Std. Deviation
The data realized meets the set standards	4.4882	.56155
The EHR helps in building the trends of diseases and treatments	4.4882	.64076
The required accuracy is realized	4.4488	.57333
The EHR data is relevant in the final accounts preparations	4.3937	.52186
The data in the EHR is consistent with real time data of the clients	4.3858	.64300
There is timeliness in the accessibility of records	4.3150	.66310
The records are always complete unlike physical files	3.7953	1.44935

4.9 Service Quality

Statistical results revealed that eligible respondents strongly agreed that technical support was offered for speedy and data quality promotion (Mean = 4.5512) and as well electronic health records systems promoted diseases management (Mean=4.5512). Also, the respondents agreed that electronic health records promoted effectiveness (Mean=4.3465) and that electronic health records system simplified the procedures of completing tasks assigned (Mean = 4.2283). The respondents also agreed that the EHRs system was key for planning and budgeting (Mean=4.2126) and the internal information technology personnel were focused on the promotion of electronic health records system quality (Mean=4.0157). Furthermore, the respondents agreed that electronic health records promoted the patient outcomes (Mean = 3.0945). In conclusion based on these findings, the respondents were able

understood that service quality influence performance of healthcare providers in public healthcare facilities within South Sudan.

Using open ended the study asked the respondents how else does service quality promote performance of healthcare providers in public health facilities in public health facilities in South Sudan, responses revealed that some of the possible means were through electronic health records based effective medical services provision; set standards of procedures (SOPs) for staff; supportive supervision; design effective referral system and set safety measures for infection prevention. Health information system (HIS) departments improve performance of healthcare providers through application of service quality components that assured effectiveness for staff to judge their performance; utilized performance standards and support staff for quality services provision in health facilities.

These findings agreed with Salleh et al. (2016) that electronic health records system is a condensed version of the patient aggregated health data cumulative of the medical records, its utility increased work efficiency among the physicians and quality assured through precise clinical judgments within the Malaysia's healthcare system. Moreover, the findings agreed with Kumarapperuma et al. (2014) that quality service, prevalence in practices and institutions enhance clinical outcomes among the patients as well enhance relations among patients/physicians and reduce health care service costs – this generated a competitive edge for those skilled in its implementation in Wales. Moreover, the findings agreed with Draiko et al. (2019) that the adoption and usage of electronic health records systems in public hospitals increased level of training which represented a significant increase in the competencies of knowledge, skills and neonatal resuscitation.

Table 4.9:

Service Quality

	Mean	Std. Deviation
A technical support is offered for speedy and quality of data promotion	4.5512	.49934
EHR promotes the disease management	4.5512	.49934
The EHR promotes effectiveness in the use of the records	4.3465	.72788
The EHR simplifies the procedures of completing tasks assigned	4.2283	1.00150
EHR is key in planning and budgeting	4.2126	.87858
Internal IT personnel are focused on the promotion of the EHR quality	4.0157	1.14076
The records promotes the patient outcomes	3.0945	.58627

4.10 Knowledge Quality

Statistical results revealed that electronic health records system was an easy source of reference point in a case of any confusion (Mean = 4.7008) and also there was informed decision-making process followed (Mean = 4.6693) as well respondents agreed there was creation of new knowledge by the use of the EHR data dynamics (Mean=4.1024); that the learning efficiency of the workers was improved (Mean=3.7638) and that the respondents agreed that electronic health records systems promoted autonomy among health care providers (Mean = 3.6378). In addition, the proportion of respondents that moderately agreed the values of workers were enhanced (Mean=3.4331) and that the needs of the workers were easily achieved (Mean=3.2205). Lastly, some respondents moderately agreed electronic health records system encouraged health care workforce to be innovative (Mean=3.1811) and that there was application of Knowledge due to some different reasons (Mean = 3.1102). Generally, the outcomes from this study based on the feedback from eligible participants

revealed that knowledge quality influence performance of healthcare providers in public health facilities in South Sudan.

Using open ended the study asked the respondents how else does knowledge quality promote performance of healthcare providers in public health facilities in South Sudan, responses from the respondents revealed that provision of information products was essential and electronic health records system made work simple. Healthcare providers were able utilized reports that improved the performance, quality of services and simplified works execution in public health facility departmental service points.

The findings basically agreed with Ameh et al. (2016) that knowledge quality influence performance among healthcare providers. In addition, the findings agreed with Pineda-Antunez et al. (2021) that electronic health records systems create integrated health data that provide knowledge applied in the treatment, CPGs storage and organizes a medical workflow including information improves knowledge quality in consideration of technical clinical judgments and increased clinician job productivity. In addition, the results agreed with Ibikunle, et al. (2021) that primary health care centers in Lagos, Nigeria performed better when health care practitioners possessed a high knowledge quality. Moreover, the findings agreed with Babiker et al. (2014) that doctors, dentists and other health practitioners in any healthcare organization can better provide excellent treatment that satisfies people through utilization of electronic health records systems.

Table 4.10:

Knowledge Quality

	Mean	Std. Deviation
Is it easy to use as a reference in case of a confusion	4.7008	.45973
Is there an informed decision-making process	4.6693	.48885

There is creation of new knowledge by the use of the EHR data dynamics	4.1024	1.39634
The learning efficiency of the workers is improved	3.7638	1.32412
EHR promotes the workers' autonomy	3.6378	1.69345
The values of the workers are promoted	3.4331	1.54093
The needs of the workers are easily achieved	3.2205	1.83404
EHR encourages workers to be innovative	3.1811	1.83189
The is applicability of Knowledge for different reasons	3.1102	1.65821

4.11 Bivariate Analysis Results

Pearson correlations determined interlink between different study variables. The results revealed that system quality and record quality had a positive, weak and insignificant correlation with a value of .097; system quality and service quality had a positive insignificant value of .035 and system quality, knowledge quality and system quality had insignificant correlations with values of .017 and .030 respectively. Moreover, record quality and service quality; record quality and knowledge quality; record quality and performance of healthcare providers were substantial and insignificant with correlational values of .085, .053 and .089 respectively. Furthermore, the results shown that service quality and knowledge quality were positively and insignificantly correlated with a value of .083 while service quality and performance of healthcare providers were positively and significantly correlated with a value of .226*. Finally, these results proved that knowledge quality and performance of healthcare providers were positive and correlational, interlinked with a value of .247** and that meant were influential on the performance of healthcare providers in public health facilities in South Sudan.

Table 4.11:

Bivariate Analysis Results

		System quality	Record Quality	Service Quality	Knowledge Quality	Performance of Healthcare Providers
System quality	Pearson Correlation	1	.097	.035	.017	.030
	Sig. (2-tailed)		.279	.700	.846	.735
	N	127	127	127	127	127
Record Quality	Pearson Correlation	.097	1	.085	.053	.089
	Sig. (2-tailed)	.279		.343	.550	.321
	N	127	127	127	127	127
Service Quality	Pearson Correlation	.035	.085	1	.083	.226[*]
	Sig. (2-tailed)	.700	.343		.353	.011
	N	127	127	127	127	127
Knowledge Quality	Pearson Correlation	.017	.053	.083	1	.247[**]
	Sig. (2-tailed)	.846	.550	.353		.005
	N	127	127	127	127	127
Performance of Healthcare Providers	Pearson Correlation	.030	.089	.226[*]	.247[**]	1
	Sig. (2-tailed)	.735	.321	.011	.005	
	N	127	127	127	127	127

*. Correlation significant at 0.05 level (2-tailed).
**. Correlation significant at 0.01 level (2-tailed).

4.12 Inferential Statistics Results

Linear model Summary that included Model, ANOVA of regression and coefficients of the determination was adopted and revealed that variables (knowledge quality, system quality, service quality and record quality) only influenced 10.7% of the performance of healthcare providers with R^2 as representative. Uncovered external factors 89.3%. To better understand these external factors, a study is recommended to evaluate external factors that influence performance of healthcare providers. Results revealed that factors that influence performance of healthcare providers were, system functionality; user interface; workflow integration; data accuracy and completeness; clinical decision support, system interoperability and data

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exchange, system reliability & performance, training and support and as well as customization and adaptability.

Table 4.12:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.327[a]	.107	.078	.35435

a. Predictors (Constant): Knowledge Quality; System quality; Service Quality and Record Quality

4.12.1: Analysis of Variance (ANOVA) Results

Based on the results, knowledge quality; system quality; service quality and record quality were significant to the performance of healthcare providers with a value of 0.007 ($p < 0.05$). In the summary, independent variables directly or indirectly influence performance of healthcare workers.

Table 4.13:

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.839	4	.460	3.662	.007[b]
	Residual	15.319	122	.126		
	Total	17.158	126			

a. Dependent Variable: Performance of Healthcare Providers
b. Predictors: (Constant), Knowledge Quality, System quality, Service Quality, Record Quality

4.12.2 Coefficients of Determination Results

Multivariate regression analysis results were derived through regression equation,

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$ became:

$Y = 2.823 + .011 X_1 + .048 X_2 + .161 X_3 + .168 X_4 + \varepsilon$

The results shown that with the four variables, any unit increase for the system quality consequently produces a .011 rise in performance of health care providers. In essence, unit increment for record quality produce a .048 decrease on performance among healthcare providers. On another hand, unit increase on service quality produce a .161 increase on performance and lastly any unit increase on knowledge quality produce a .168 increase on the performance.

At the significance level of 95%, service quality and knowledge quality were significant factors which were influencing the performance of healthcare with significant values of .021 and .009 respectively. Moreover, system quality and record quality were insignificant determinants of the performance of healthcare providers with significance values of .873 and .501 respectively. Significantly, the outcomes proved that knowledge quality at most was a significant factor that determined performance among healthcare providers with a value of .009 and followed by service quality with value of .021.

In essence, the study results revealed that service quality was significant factor that influence the performance of healthcare providers with significant value of .021. The results agreed with Salleh et al. (2016) that Malaysia's health care professionals perform considerably and favourably because of system quality attributes. In addition, the findings agree with Kumarapperuma et al. (2014) that service quality significantly influenced the performance of healthcare providers in Wales. In addition, results concur with Wanjau et al. (2012), service quality influenced performance of health care providers, a case of Kenya. Moreover, the findings agree with Draiko et al. (2019) that service quality significantly influenced the performance of healthcare providers in White Nile state, Sudan.

Furthermore, the study found that knowledge quality was a significant factor that influenced performance with significant value of .009. The results concur with Ameh et al. (2016),

knowledge quality positively impacts how well EHRs systems were used and consequently affects how well healthcare practitioners performs in healthcare services provision. Also, the findings agree with Pineda-Antunez et al. (2021) that knowledge quality has a substantial and advantageous impact on health care professionals' performance. Additionally, the findings concur with Ibikunle et al. (2021) that primary health care centers in Lagos, Nigeria performed better when health care practitioners had a higher knowledge quality. Moreover, the findings agree with Babiker et al. (2014) that information quality substantially and positively affected the Sudanese health care professionals' growth and performance within health sector.

In addition, the study found that system quality was an insignificant factor that was influencing the performance of healthcare providers at Juba teaching and referral hospital with significant value of .873. The findings disagree with Salyers et al. (2017) that system quality substantially affected healthcare providers in North Ireland. Further, the findings disagree with Cunningham et al. (2018) that system quality greatly enhanced healthcare quality and healthcare worker performance in Greece. The findings agreed with Tilahun and Fritz (2015) that the influenceiveness of healthcare providers is positively impacted by system quality. In addition, the results agree with Bossen et al. (2013), that the performance of healthcare professionals and the efficient usage of EHRs systems were both positively impacted by service quality.

Finally, the study found that record quality was an insignificant factor in influencing the performance of healthcare providers at Juba teaching and referral hospital, South Sudan with significant value of .501. The findings disagree with Chang et al. (2021) that record quality had a large and favourable impact on performance of healthcare professionals in China health sector. In addition, results found also disagree with Zegers et al. (2019) that record quality significantly influenced the performance of healthcare providers in Serbia. Also, these results

agree with Rasmi et al. (2018) study on the Jordanian healthcare industry that embrace of EHRs systems benefited healthcare professionals and improved records quality. The findings disagree with Ayanlade (2018) that the performance of health care professionals in Nigeria had greatly increased because of EHRs and ICT application realized in provision of quality assured health care services.

Table 4.14:

Coefficients of the Determination Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.823	.498		5.668	.000
System quality	.011	.070	.014	.160	.873
Record Quality	.048	.071	.058	.674	.501
Service Quality	.161	.069	.202	2.341	.021
Knowledge Quality	.168	.064	.227	2.640	.009

a. Dependent Variable: Performance of Healthcare Providers

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This section presents the findings summary, derived conclusions and recommendations on the effects of electronic health records systems adoption on the performance of healthcare providers in South Sudan with a focus on Juba Teaching and Referral Hospital. It also contains areas for further studies.

5.2 Summary of Findings

The study's main objective was to establish the effects of electronic health records systems adoption on the performance of healthcare providers in South Sudan with a focus on Juba Teaching and Referral Hospital. The study specific objectives were to establish the effect of system quality, record quality, service quality and knowledge quality on the performance of healthcare providers at Juba Teaching Hospital. The study collected, analysed and presented data in chapter four with study variables being used as parameters for the analysis.

5.2.1 System Quality

The study found that the EHR promoted the workflow within health facilities and that the EHR promoted the security of the personal or organisational information stored. Furthermore, the study found that the information recorded was perceived to be protected and secure, and that there was system interoperability among the various departments within the facilities. Moreover, the study found that there was update of the system every time new technological innovations were realized and that there was compatibility of EHR systems with other systems within the facility. In addition, the study found that the IT infrastructure was streamlined with the physical filing of records. Also, the study found that any system failure was not corrected immediately. The results imply that the various aspects of system quality influenced the performance of healthcare providers at Juba Teaching and Referral Hospital.

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5.2.2 Records Quality

The study found that the data realized met the set standards and that the EHR helped in building the trends of diseases and treatments. In addition, the study found that the required accuracy was realized and that the EHR data was relevant in the final accounts preparations. Moreover, the study found that the data in the EHR was consistent with real time data of the clients and that there was timeliness in the accessibility of records. Also, the study found that the records were always complete unlike physical files. The results imply that the various aspects of records quality influenced the performance of healthcare providers at Juba Teaching and Referral Hospital.

5.2.3 Service Quality

The study found that technical support was offered for speedy and quality of data promotion and EHR promoted the disease management. In addition, the study found that the EHR promoted the effectiveness in the use of the records and that the EHR simplified the procedures of completing tasks assigned. Additionally, the study found that EHR was key in planning and budgeting and that Internal IT personnel were focused on the promotion of the EHR quality. Further, the study found that the records promoted the patient outcomes. The results imply that the various aspects of service quality influenced the performance of healthcare providers at Juba Teaching and Referral Hospital.

5.2.4 Knowledge Quality

The study found that it was easy to use as a reference in case of confusion and that there was informed decision-making process. In addition, the study found that there was creation of new knowledge by the use of the EHR data dynamics and that the learning efficiency of the workers was improved. Further, the study found that EHR promoted the workers' autonomy.

Moreover, the study found that the values of the workers were moderately promoted and that the needs of the workers were easily achieved. In addition, the study found that EHR encouraged workers to be innovative and that there was applicability of Knowledge for different reasons. The results imply that the various aspects of knowledge quality influenced the performance of healthcare providers at Juba Teaching and Referral Hospital.

5.2.5 Performance of Healthcare Providers

The study found that the workers were motivated to work towards the realizing the personal and organisational goals and that quality health services were offered to clients. In addition, the study found that EHR promoted the storage and accessibility of patients' information and that EHR promoted the quality of the data stored and available for planning. Moreover, the study found that time spent per client was greatly reduced and that the quality of communication between the staff was promoted. Additionally, the respondents agreed that the productivity of the workers was improved (Mean=3.9370) and the EHR promoted the worker's responsiveness (Mean=3.8976). Further, the study found that the workers were satisfied with their work (Mean=3.7323). The results imply that the various aspects of electronic health records systems affected the performance of healthcare providers. According to the regression equation, the study found that taking all factors (knowledge quality, system quality, service quality and record quality) to be constant at zero, the performance of healthcare providers at Juba Teaching and Referral Hospital would be 2.823. The study further found that with the four variables, a unit rise in system quality would lead to a .011 rise in the performance of healthcare providers at Juba Teaching and Referral Hospital. In addition, the study found that a unit rise in record quality would lead to a .048 decrease in the performance of healthcare providers at Juba Teaching and Referral Hospital. The study found that a unit increase in service quality would lead to a .161 increase in the performance of healthcare providers at Juba Teaching and Referral Hospital; while a unit

increase in knowledge quality would lead to a .168 increase in the performance of healthcare providers at Juba Teaching and Referral Hospital.

At the significance level of 95%, the study found that service quality and knowledge quality were significant factors in influencing the performance of healthcare providers at Juba Teaching and Referral Hospital with significant values as .021 and .009 respectively. Further, the study found that system quality and record quality were insignificant determinants of the performance of healthcare providers at Juba Teaching and Referral Hospital with significance values of .873 and .501 respectively. The study also found that the knowledge quality was the most significant factor in the performance of healthcare providers at Juba Teaching and Referral Hospital with a value of .009; followed by service quality with a significance value of .021.

5.3 Conclusion

The study concluded that the EHR promoted the workflow within health facilities and that the EHR promoted the security of the personal or organisational information stored. Further, the study concludes that the information recorded was perceived to be protected and secure and that there was system interoperability among the various departments within the facilities. Moreover, the study concludes that there was update of the system every time new technological innovations were realized and that there was compatibility of EHR systems with other systems within the facility. In addition, the study concludes that the IT infrastructure was streamlined with the physical filing of records. Also, the study concludes that any system failure was not corrected immediately. The results imply that the various aspects of system quality influenced the performance of healthcare providers at Juba Teaching and Referral Hospital.

The study concludes that the data realized met the set standards and that the EHR helped in building the trends of diseases and treatments. In addition, the study concludes that the

required accuracy was realized and that the EHR data was relevant in the final accounts preparations. Moreover, the study concludes that the data in the EHR was consistent with real time data of the clients and that there was timeliness in the accessibility of records. Also, the study concludes that the records were always complete unlike physical files. The results imply that the various aspects of records quality influenced the performance of healthcare providers at Juba Teaching and Referral Hospital.

The study concludes that technical support was offered for speedy and quality of data promotion and EHR promoted the disease management. In addition, the study concludes that the EHR promoted the effectiveness in the use of the records and that the EHR simplified the procedures of completing tasks assigned. Additionally, the study concludes that EHR was key in planning and budgeting and that Internal IT personnel were focused on the promotion of the EHR quality. Further, the study concludes that the records promoted the patient outcomes. The results imply that the various aspects of service quality influenced the performance of healthcare providers at Juba Teaching and Referral Hospital.

The study concludes that it was easy to use as a reference in case of confusion and that there was informed decision-making process. In addition, the study concludes that there was creation of new knowledge by the use of the EHR data dynamics and that the learning efficiency of the workers was improved. Further, the study concludes that EHR promoted the workers' autonomy. Moreover, the study concludes that the values of the workers were moderately promoted and that the needs of the workers were easily achieved. In addition, the study concludes that EHR encouraged workers to be innovative and suggested applicability of Knowledge for different reasons. The results imply that the various aspects of knowledge quality influenced the performance of healthcare providers at Juba Teaching and Referral Hospital.

The study concludes that the workers were motivated to work towards the realizing the personal and organisational goals and that quality health services were offered to clients. In addition, the study concludes that EHR promoted the storage and accessibility of patients' information and that EHR promoted the quality of the data stored and available for planning. Moreover, the study concludes that time spent per client was greatly reduced and that the quality of communication between the staff was promoted. Additionally, the respondents agreed that the productivity of the workers was improved (Mean=3.9370) and the EHR promoted the worker's responsiveness (Mean=3.8976). Further, the study concludes that the workers were satisfied with their work (Mean=3.7323). The results imply that the various aspects of electronic health records systems affected the performance of healthcare providers.

According to the regression equation, the study concludes that taking all factors (knowledge quality, system quality, service quality and record quality) to be constant at zero, the performance of healthcare providers at Juba Teaching and Referral Hospital would be 2.823. The study further concludes that with the four variables, a unit rise in system quality would lead to a .011 rise in the performance of healthcare providers at Juba Teaching and Referral Hospital. In addition, the study concludes that a unit rise in record quality would lead to a .048 decrease in the performance of healthcare providers at Juba Teaching and Referral Hospital. The study concludes that a unit increase in service quality would lead to a .161 increase in the performance of healthcare providers at Juba Teaching and Referral Hospital; while a unit increase in knowledge quality would lead to a .168 increase in the performance of healthcare providers at Juba Teaching and Referral Hospital.

At the significance level of 95%, the study concludes that service quality and knowledge quality were significant factors in influencing the performance of healthcare providers at Juba Teaching and Referral Hospital with significant values as .021 and .009 respectively. Further, the study concludes that system quality and record quality were insignificant determinants of

the performance of healthcare providers at Juba Teaching and Referral Hospital with significance values of .873 and .501 respectively. The study also concludes that the knowledge quality was the most significant factor in the performance of healthcare providers at Juba Teaching and Referral Hospital with a value of .009; followed by service quality with a significance value of .021.

5.4 Recommendations

The study recommends that in promoting system quality; the EHR system should be reliable, secure, and easy to use. It should be able to handle large volumes of data without crashing or causing delays. The system should also have proper backup and disaster recovery mechanisms to ensure data is not lost in case of a system failure. Additionally, the system should have regular updates to improve its functionality and security.

The study recommends that in promoting record quality; EHR systems should ensure that the quality of the patient record is maintained. The system should be able to capture complete and accurate patient information, including medical history, medications, allergies, and other relevant details. The system should also be able to update the record in real-time to ensure that the information is always up to date. This can help reduce errors and improve the quality of care.

The study recommends that in promoting service quality; the vendor should provide training and support to healthcare providers to ensure they are proficient in using the system. The vendor should also have a responsive support team to address any issues that may arise promptly. The vendor should also provide regular system maintenance and updates to improve the functionality and security of the system.

The study recommends that in promoting knowledge quality; EHR systems should provide healthcare providers with accurate and timely information. The system should have a user-

friendly interface that enables healthcare providers to access patient information easily. The system should also provide alerts and reminders to healthcare providers to ensure that they follow best practices and guidelines in patient care.

5.5 Areas for Further Research

The study findings indicate that factors not covered in this study influenced 89.3% of the performance of healthcare providers at Juba Teaching and Referral Hospital. Hence, additional research should be conducted with the aim of determining the other factors that influence 89.3% of the performance of healthcare providers at Juba Teaching and Referral Hospital. The study recommends a study to be conducted on the effects of work ethics practices on performance of health workers at Juba Teaching and Referral Hospital in South Sudan. In addition, study should be conducted to determine the factors influencing the distribution of healthcare workers in South Sudan.

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APPENDICES

Appendix I: Questionnaire

SECTION A: Demographic Information

1. What is your gender?

    Female [ ]   Male [ ]

2. What is your age bracket?

    Less than 25 years [ ]   26-35 years [ ]

    36-45 years [ ]   Above 45 years [ ]

3. What is your highest education level?

    Certificate level [ ]   Diploma level [ ]   Graduate/Degree [ ]

    Postgraduate [ ]   Others-specify……..… [ ]

4. For how long have you worked in your position?

    Less than 1 year [ ]   1-5 years [ ]

    6-10 years [ ]   Over 10 years [ ]

5. How do you rate the condition electronic health records system?

    Very Good [ ]   Good [ ]   Moderately Good [ ]

    Poor [ ]   Very Poor [ ]

Section B: System Quality

6. Using a scale of 1-5 where 1-strongly disagree, 2- disagree, 3-Moderately agree, 4-Agree and 5-Strongly agree, kindly indicate your agreement level to the statements below that relate to System Quality.

Statements	1	2	3	4	5
EHRs promotes workflow within health facilities					
The EHRs promotes the security of the personal or organisational information stored					
The information recorded is perceived to be protected and secure					
There is system interoperability among the various departments within the facilities					
There is update of the system every time new technological innovations are realized					
There is compatibility of EHR systems with other systems within the facilities					
The IT infrastructure is streamlined with the physical filing of records					
Any system failure is corrected immediately					

7. How else does System Quality promote performance of healthcare workers in public hospitals?

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SECTION C: Record Quality

8. Using a scale of 1-5 where 1-strongly disagree, 2- disagree, 3-moderately agree, 4-agree and 5-strongly agree, kindly indicate your agreement level to the statements below that relate to Record Quality

Statements	1	2	3	4	5
The data realized meets the set standards					
The EHR helps in building the trends of diseases and treatments					
The required accuracy is realized					
The EHR data is relevant in the final accounts preparations					
The data in the EHR is consistent with real time data of the clients					
There is timeliness in the accessibility of records					
The records are always complete unlike physical files					

9. How else does record quality promote the performance of healthcare workers in public

hospitals?...

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Section D: Service Quality

10. Using a scale of 1-5 where 1-strongly disagree, 2- disagree, 3-moderately agree, 4-agree and 5-strongly agree, kindly indicate your agreement level to the statements below that relate to Service Quality.

Statements	1	2	3	4	5
A technical support is offered for speedy and quality of data promotion					
EHR promotes the disease management					
The EHR promotes effectiveness in the use of the records					
The EHR simplifies the procedures of completing tasks assigned					
EHR is key in planning and budgeting					
Internal IT personnel are focused on the promotion of the EHR quality					
The records promotes the patient outcomes					

11. How else does Service Quality promote the performance of healthcare workers in public hospitals?

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SECTION E: Knowledge Quality

12. Using a scale of 1-5 where 1-strongly disagree, 2- disagree, 3-Moderately agree, 4-Agree and 5-Strongly agree, kindly indicate your agreement level to the statements below that relate to Knowledge Quality

Statements	1	2	3	4	5
Is it easy to use as a reference in case of a confusion					
Is there an informed decision-making process					
There is creation of new knowledge by the use of the EHR data dynamics					
The learning efficiency of the workers is improved					
EHR promotes the workers' autonomy					
The values of the workers are promoted					
The needs of the workers are easily achieved					
EHR encourages workers to be innovative					
The is applicability of Knowledge for different reasons					

13. How else does knowledge quality promote the performance of healthcare workers in public hospitals?

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Section F: Performance of Healthcare Providers

14. Using a scale of 1-5 where 1-Strongly Disagree, 2- Disagree, 3-Moderately Agree, 4-
    Agree and 5-Strongly Agree, kindly indicate your agreement level to the statements
    below that relate to performance of healthcare providers.

Statements	1	2	3	4	5
The workers are motivated to work towards realizing the personal and organisational goals					
Quality health services are offered to clients					
The EHRs systems promotes the storage and accessibility of patients information					
The EHRs promotes the quality of the data stored and available for planning					
Time spent per client is greatly reduced					
The quality of communication between the staff is promoted					
The productivity of the workers is improved					
The EHR promotes the worker's responsiveness					
The workers are satisfied with their work					

15. How else does EHR promote the performance of healthcare workers in public
    hospitals?

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Appendix II: Approval Letters

KENYA METHODIST UNIVERSITY

P. O. Box 267 Meru - 60200, Kenya
Tel: 254-064-30301/31229/30367/31171

Fax: 254-64-30162
Email: deanrd@kemu.ac.ke

DIRECTORATE OF POSTGRADUATE STUDIES

February 21, 2023

Commission Secretary,
National Commission for Science, Technology and Innovations,
P.O. Box 30623-00100
NAIROBI.

Dear Sir/Madam,

RE: ALIER PAUL DARAKUACH MAKOL – (REG. NO. HSM-3-1673-1/2021)

This is to confirm that the above named person is a bona fide student of Kenya Methodist University, in the School of Medicine and Health Sciences, Department of Health System Management undertaking a Master's Degree in Health System Management. He is conducting research on; "Effects of Electronic Health Records Systems Adoption on the Performance of Healthcare Providers in South Sudan, A Case of JUBA Teaching and Referral Hospital".

We confirm that his research proposal has been presented and approved by the University.

In this regard, we are requesting your office to issue a research license to enable his collect data.

Any assistance accorded to him will be appreciated.

Thank you.
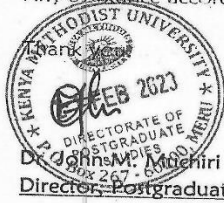
Dr. John M. Muchiri (PhD)
Director, Postgraduate Studies

Cc: Dean SMHS
CoD, HSM
Program Coordinator -HSM
Student Supervisors

KENYA METHODIST UNIVERSITY
P. O. BOX 267 MERU - 60200, KENYA   FAX: 254-64-30162
TEL: 254-064-30301/31229/30367/31171   EMAIL: INFO@KEMU.AC.KE

February 20, 2023   KeMU/ISERC/HSM/03/2023

ALIER PAUL DARAKUACH MAKOL
HSM-3-1673-1/2021

Dear Paul,

SUBJECT: EFFECTS OF ELECTRONIC HEALTH RECORDS SYSTEMS ADOPTION ON THE PERFORMANCE OF HEALTHCARE PROVIDERS IN SOUTH SUDAN. A CASE OF JUBA TEACHING AND REFERRAL HOSPITAL
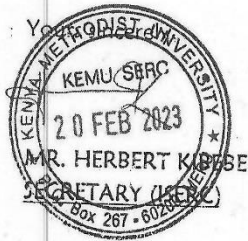
This is to inform you that Kenya Methodist University Institutional Scientific Ethics and Review Committee has reviewed and approved your research proposal. Your application approval number is KeMU/ISERC/HSM/03/2023. The approval period is 20th February, 2023 – 20th February, 2024.

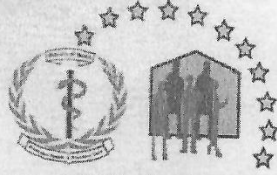This approval is subject to compliance with the following requirements:-

I.   Only approved documents including (informed consents, study instruments, MTA) will be used.

II.   All changes including (amendments, deviations, and violations) are submitted for review and approval by Kenya Methodist University Institutional Scientific Ethics and Review Committee.

III.   Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KeMU ISERC within 72 hours of notification.

IV.   Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KeMU ISERC within 72 hours.

V. Clearance for export of biological specimens must be obtained from relevant institutions.

VI. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.

VII. Submission of an executive summary report within 90 days upon completion of the study to KeMU ISERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours Sincerely

KENYA METHODIST UNIVERSITY
KEMU ISERC
2 0 FEB 2023
MR. HERBERT KIBBBE
SECRETARY (ISERC)
Box 267 - 6020

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REPUBLIC OF SOUTH SUDAN

Ministry of Health, Research Ethics Review Board (MOH-RERB), Juba.

MOH/RERB/P/14/08/03/2023- MOH/RERB/A/17/17/03/2023

Date: 8th March 2023

Darakuach Paul Makol Alier, Master Student, Kenya Methodist University

Dear Paul & Supervisor(s),

Subject: A No Objection to Conduct a study "Effect of Electronic Health Records Systems Adoption on Performance of Healthcare Providers in South Sudan: A Case of Juba Teaching and Referral Hospital

1. This is in response to the request for authorization of **Paul Makol**, an MPH student at Kenya Methodist University to implement "effect of electronic health records systems adoption on performance of healthcare providers". As part of health information system(HIS) technological transformation, reforms and integration modalities toward one health and one database approach.

2. Hereafter, the Ministry of Health, Research Ethics and Review Board(MOH-RERB) has determined that in accordance with the National Guidelines September 2019, for research involving humans in the Republic of South Sudan, the activity highlighted therein, meets the requirement and criteria for approval for implementation of the research activity and exempted it's from MOH-RERB oversight. The MOH-RERB request the administration of Juba Teaching and Referral Hospital, and facility in charge to kindly facilitate the process of this data collection thereof.

3. Hence, the MOH-RERB requires you to comply with all institutional guidelines, rules, and regulations and with the tenets of the code. The MOH-RERB advises that the investigation report and recommendations should not be submitted, shared, and published to peer-reviewed journals, or websites before obtaining a consent to published from MOH-RERB.

4. The MOH-RERB thus, reserves the right to conduct compliance visit to your research site without previous notification. And this approval is valid from 20th March-30th April 2023 and subjected to renewal if deemed necessary.

5. Please accept the assurances of my highest considerations and regards.

Amanya Jacob Kasio Iboyi, MPH-SMU, PhD (S)-NU(Uganda)

D/Director Research, & D/Chairperson, MOH-RERB-Juba/RSS

Cc: SMOH/CHD/JTH, and Referral Hospitals Administrator(s), and HFs in-charges