SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS SYSTEM ON QUALITY OF CARE / PATIENT SATISFACTION AT THE 37 MILITARY HOSPITAL

BY

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THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE MASTER OF PUBLIC HEALTH (MPH) DEGREE

DECEMBER, 2021

DECLARATION

I, Adelaide Anakwa Awuku, declare that apart from references to other people's works, which have been duly acknowledged, this dissertation is as a result of my own independent work and has not been submitted in any tertiary institutions.

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DATE

DEDICATION

This dissertation is dedicated to my family and friends for their assistance throughout my studies.

ACKNOWLEDGEMENT

My profound gratitude goes to my supervisor, Dr. Augustine Adomah-Afari, whose guidance, support and direction contributed to the successful completion of this dissertation. I also acknowledge my family, friends and loved ones for their encouragement in my educational journey.

ABSTRACT

Background: Electronic health records system was introduced as part of Health Management Information System and a replacement of the paper based health records system to facilitate smooth delivery of healthcare services. In Ghana, the 37 Military Hospital had been acknowledged as one of the quasi-government hospitals leading in the implementation of electronic health records system with the aim of providing quality healthcare services.

Objective: The general objective of this study was to assess the implementation of the electronic health records system on quality of care/patient satisfaction at the 37 Military Hospital in Ghana.

Methods: The study adopted a positivist philosophical approach with a case study research design to collect data through the use of questionnaires from three hundred and thirty-six (336) health workers and two hundred and twenty-eight (228) patients; giving a total sample size of five hundred and sixty-four (564) respondents for the study. Health workers and patients were recruited through purposive and simple random sampling methods respectively. Two sets of questionnaires were designed and answered by the participants using both self-administered strategy and interviewer-administered strategy depending on the background of the participants. The returned questionnaires were cleaned and entered into STATA version 14.0 for analysis. Descriptive statistics, chi square test and logistic regression analysis were applied to establish the needed

associations between the dependent and independent variables. The level of significance was accepted at $p<0.05$ at a 95% confidence interval.

Results: The results showed that experiences of health workers of the electronic health records system was significantly associated with quality of care (x^2= 19.8814, p=0.011). On the part of the patients, the frequency of patients' visit to the health facility (x^2= 12.6290, p=0.049) was significantly associated with quality of care/patient satisfaction. The study indicated that the 37 Military Hospital was assessed by patients to be very good in respect of attention to patients' need (M=3.68, SD=0.525), responsiveness of health providers to emergencies (M=3.81, SD=0.651), efficiency of services rendered (M=3.78, SD=0.576), timeliness of healthcare (M=3.78, SD=0.576), general patients' care (M=3.86, SD=0.528) and overall level of quality of care (M=4.02, SD=0.636). In addition, the hospital was assessed by health workers to be good in terms of adequate staffing (M=2.94, SD=1.007), effective administration structure to deliver quality of care (M=2.88, SD=0.919), serene hospital environment (M=3.34, SD=1.04), adequate medical equipment to provide quality of care (M=2.88, SD=1.02) and overall level of quality of care (M=3.36, SD=0.898). The results indicated an association between perceived usefulness (t=0.57, p=0.570), perceived ease of use (t=0.48, p=0.629) and behaviour control (t=0.40, p=0.687) of the electronic health records system and quality of care (t=5.18, p=0.000). Additionally, the results revealed that 71% of patients (M=3.73, SD=0.86) and 36.9% of health workers (M=3.23, SD=0.98) confirmed overall level of satisfaction with the implementation of the electronic health records system (EHRs) at the 37 Military Hospital. Additionally, the results indicated that a unit increase in attention to patients' health needs (t=1.15, p=0.259), in responsiveness of health providers to

emergencies (t=0.10, p=0.922), in patient-provider communication (t=0.10, p=0.917), in efficiency of health services rendered (t=2.57, p=0.015), in timeliness of healthcare (t=3.20, p=0.003) and general patients' care (t=2.46, p=0.020) would increase patients' satisfaction at the 37 Military Hospital. However, the study showed that the listed challenges with the implementation of the EHRs at the 37 Military Hospital included: poor network (41%), lack of backup power to run the system during power outages (28.5%), difficulty in retrieving saved patients' medical records (9.5%), limited availability of electronic devices to run EHR software (7.6%), difficulty in displaying patients' medical/laboratory reports (5.7%), difficulty in correcting saved patients' medical records (4.8%) and delay in the transmission of medical results across units (2.9%).

Conclusion / Recommendations: The study established an association between perceived usefulness ($p<0.05$), perceived ease of use ($p<0.05$) and behaviour control ($p<0.05$) of the electronic health records system (EHRs) and quality of care. Moreover, there were listed challenges confronting staff in the implementation of the electronic health records system at the hospital. Therefore, the study recommends that the Ministry of Health/Ghana Health Service should reshape its information, communication and technology (ICT) policy and strategy for the health sector to ensure adequate ICT infrastructure and human resource to drive the implementation of electronic health records system (EHRs) in health institutions. The study further recommends that the Management of the 37 Military Hospital should consider an alternative network infrastructure and procurement of electronic devices for all units at the hospital to ensure smooth transmission of records across units and initiate training programmes for health

workers operating the electronic health records system (EHRs) to enhance their understanding and knowledge of the system. Additionally, the study recommends that patients and communities should exercise patience while the hospital tries to improve on the electronic health records system to deliver quality healthcare services to enhance their satisfaction.

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LIST OF ABBREVIATION

CHPS	-	Community-based Health Planning and Services
EHRs	-	Electronic Health Records System
HIT	-	Health Information Technologies
HMIS	-	Health Management Information System
IGF	-	Internally Generated Fund
MoF	-	Ministry of Finance
TAM	-	Technology Acceptance Model
TPB	-	Theory of Planned Behaviour
WHO	-	World Health Organization

DEFINITION OF TERMS

Implementation: The process of putting a decision or plan (such as the use of electronic records health system) into effect.

Electronic Health Records System: Electronic database encrypt with a patient's health history or information, which is created, managed and utilised by an authorised health staff during health care delivery.

Quality of Care: Access to healthcare structures and processes of care, which patients and healthcare providers need and perceived as effective.

CHAPTER ONE

INTRODUCTION

1.0. Background of the study

Many patients have been dissatisfied with healthcare provision in health institutions. There have been numerous complaints about the apparent lack of quality healthcare delivery (Skar & Soderberg, 2018). These complaints mainly revolved around waiting time, provider-patient communication, delay in getting laboratory results and movement in-between various departments of the health facilities to collect one report or the other (Atinga, Abekah-Nkrumah & Domfeh, 2011). In resolving some of the challenges that patients faced when too much time was wasted at health institutions, the electronic health records system (EHRs) was introduced as part of health management information system (HMIS) to facilitate the smooth delivery of healthcare. This has the potential to enhance the quality of care (Evans, 2016).

Generally, record keeping forms an integral part in societies; teachers keep records of their students to ensure accountability, businesses keep records of their customers to facilitate communication and governments keep records of their citizens to ensure effective planning and implementation of developmental projects (Rolan, 2017). Likewise, record keeping plays an important role in the health sector by promoting accurate and quality healthcare by serving as a principal structure for storing and documenting patients' medical data, thereby, improving communication and follow up investigation and diagnosis (Wali, Alquahtani, Alharazi, Bukhari & Ququandi, 2020).

Evans (2016) opined that health records of patients were initially written on paper by a health provider at the point of service delivery after which the data collected from the patient was maintained in a folder and archived into the record section of the health institution. However, inevitable challenges associated with manual paper-based health recording system such as periodic missing of patients' data, illegible handwriting of some health personnel resulting in errors in diagnosis, prescription and treatment, difficulty of accessing patients' files, bulky nature of some patients' files and the need for large storage rooms to meet growing number of patients created the path for the development and introduction of EHRs (Khalifa, 2017).

The revolution of computer technology in the 1960s coupled with the quest to provide quality healthcare created a firm groundwork for the development and introduction of electronic health record system (Mysen, Penprase & Picotty, 2016). The electronic health record system was described as an electronic database encrypted with an individual's health history or information which was created, managed and utilized by an authorized health staff during healthcare delivery (Abdullahi, Adanu, GiyaJoua, Yakubu & Gwamna, 2018). Thus, an electronic health record was a digital version designed to collect, store and retrieve a patient's health information compared to a manual health record in which the records were kept in folders and retrieved from the folders' room. Electronic health records system has facilitated a revolutionary transition in healthcare delivery from paper-based health records to its electronic version (Job, Bachmann, Schmid, Thiel, & Ivic, 2012).

Schopf, Nedrebo, Hufthammer, Daphu and Laerum (2019) asserted that the increasing adoption of EHRs by health institutions was driven by the intention to provide quality healthcare delivery services, minimize the workload of health personnel and reduce medical errors of patients through the use of a uniform format for documentation, accessibility and communication. The electronic health records system was perceived to spearhead quality healthcare by smoothening the documentation of patients' diagnostic examination and treatment, providing medical decision support and facilitating swift communication among healthcare providers.

Ghana, as a developing country, has made considerable progress in accelerating the use of EHRs in health institutions since the commencement of its national policy on electronic health in 2010 (Achampong, 2012). The 37 Military Hospital has been acknowledged as one of the quasi-government hospitals leading the implementation of EHRs in Ghana with the objective of providing quality healthcare services (Modern Ghana, 2020).

Despite the notable merits associated with electronic health records, various barriers have been acknowledged to impede its implementation (Godberg, Kuzel, Feng, Deshazo & Love, 2012). Godberg et al. (2012) cited these barriers as cost, complex setup of EHRs functions and system and time to learn the features of the system among others. Meanwhile, it is not clear if there are apparent challenges with the perceived ease of use, perceived usefulness and patients' satisfaction with the implementation of EHRs in health

institutions in Ghana. Hence, this study aims to assess the influence of the implementation of EHRs on the quality of care at the 37 Military Hospital in Ghana.

1.1. Problem Statement

Health Information System was regarded as one of the most integral parts of the healthcare system of which various processes of care delivery were subjected to (Wager, Lee & Glaser, 2017). Thus, the implementation of electronic health record system in health facilities was to efficiently process patients' medical data and information such as investigations, diagnoses and treatments among others, thereby, guaranteeing quality patient care and safety (Khalifa, 2017). Obviously, the electronic health records system has a tremendous possibility of improving synchronization of healthcare through making information electronically available and readily accessible at the point of healthcare delivery, especially when implemented throughout the institution (Ismail et al., 2010).

The speed of adoption was observed to be more rapid in developed countries than developing countries (Hoque, Bao & Sorwar, 2017). This deduction confirmed an observation that there was a 46% increase in the implementation of EHRs in the past 5 years globally, with upper middle and high income countries spearheading the revolutionary transition while lower middle and low income countries recorded a lower implementation rate (World Health Organization (WHO), 2021). Additionally, the World Health Organization revealed that the implementation of electronic records system recorded the highest integration with laboratory (77%), followed by pharmacy

information system (72%) and communications systems (56%) among majority of member states (World Health Organization (WHO), 2021).

One of the major problems confronting the 37 Military Hospital is how to deal with the increasing number of patients accessing services which causes delay in patients' waiting time. This is because the hospital, which was established on 4th July, 1941, began with 29 beds but increased to about 400 beds with specialized units since the hospital opened its healthcare services to the public (Addo, 2016). Ampeah-Woode (2019) reported that the increasing number of patients which patronize the facility led to an expansion in projects, including migration onto an EHRs in 2018. It was perceived that the implementation of the EHRs was going to effectively absorb its increasing patients by improving the hospital's data system, reducing patients' waiting time, eliminating the incident of lost folders and facilitating monitoring and report generation, thereby, providing quality healthcare services and achieving its objective of going paperless (Ampeah-Woode, 2019). However, there is still a challenge with patients' waiting time due to the lack of extension of the EHRs to all departments of the 37 Military Hospital.

Achieving the overall objective of measuring the influence/effect of the implementation of the electronic health records system on the quality of care at the 37 Military Hospital required the need to identify the influence of its implementation to deliver quality care in health institutions in the following areas discussed below.

Individual factors of health personnel such as age, sex, years of experience, educational level and rank could pose a potential challenge to the implementation of the EHRs to deliver quality care in health institutions. This is because the electronic health records system requires attention and time to learn its complex functions. Studies shows that health providers who are above a certain age limit find it increasingly difficult to adjust to the new technological system due to inability to learn computer applications (Johnson, Jacovina, Russell & Soto, 2016).

The electronic health records system is perceived to be a vital tool to reduce medical errors, improve organizational efficiency, decrease healthcare costs and promote the quality of healthcare services. However, the costs involved in implementing and managing this system in health institutions could potentially outweigh its perceived usefulness. Health providers who have challenges with the use of modern technology do not see the introduction of such an innovation as useful in the delivery of quality healthcare due to lack of personal interaction with patients similar to what has been documented (Alotaibi & Federico, 2017).

The electronic health records system was designed to facilitate sharing and storage of patients' medical information across departments within a health institution. However, computer skills and competencies of health personnel were presenting a potential challenge against its perceived ease of in delivering quality care at the hospital. A study observed that obstacles to the use of this system included high cost of maintenance, bad network set-up and lack of ease among health workers with the EHRs (Akanbi et al.,

2012). Indeed, nurses' dissatisfaction with it remained high at the hospital — a situation that had been noted earlier (Nelson, 2016).

Availability of policies, rules and procedures to guide accessibility and retrieval of medical information from the electronic health records system in a health institution were observed based on anecdotal evidence as very crucial behavior control measures for health personnel at the hospital. Absence of these behavior control measures was posing a potential challenge in areas of privacy and confidentiality of patients' medical information. Similarly, studies had reported how health providers struggled to adapt to these changes in the implementation of the electronic records system (Lluch, 2011). Lluch (2011) showed the evidence that despite their apparent capacity, health information technologies (HIT) had been noted to be difficult to implement due to barriers related to organizational management and its interrelations.

Electronic health records system was primarily designed to maximize patients' satisfaction through minimizing waiting time and facilitating communication with healthcare providers among others. However, it was observed that the presence of the computer coupled with the necessity to document a patient's medical information was affecting communication between patients and healthcare providers, thereby, reducing patients' overall satisfaction with the implementation of the electronic health records system at the hospital. This was similar to what had been established in literature (Koide, Asonuma, Naito, Igawa, & Shimizu, 2006).

1.2. Justification of the study

It has been argued that the implementation of the EHRs will improve the quality of care, for instance, enhancing patient waiting time in healthcare institutions (Ampeah-Woode, 2019). Thus, it was important to justify the need for the conduct of this study on the implementation of the EHRs. The apparent gaps recognized in literature have been summarized in the areas presented below.

Limited studies investigated individual (socio-demographic characteristics) factors and the use of the EHRs to enhance the quality of care delivery in health institutions (Biruk, Yilma, Andualem, & Tilahun, 2014). Biruk et al. (2014) discovered that the totality of health professionals' willingness for the EHRs and utilization were 54.1% and 46.5% respectively in Ethiopia. These researchers noted that gender, knowledge, attitude and computer-related skills were the determinants of the presence of a relatively low readiness and utilization of the system. It appeared that no study had also investigated these factors at the study site. Thus, this study was to fill this gap by establishing the association between individual (socio-demographic characteristics) factors and the quality of care/patients satisfaction after the implementation of the EHRs at the 37 Military Hospital.

Earlier studies suggested that the cumulative attentiveness, knowledge and skills of healthcare professionals of the EHRs before the implementation of the system were essential to escalate its acceptance (Biruk et al., 2014). Numerous studies sought to assess the usefulness of the EHRs within health settings (Tubaishat, 2018). It appeared that no

study had assessed how healthcare providers were considering the EHRs as useful to the quality of care objective of the hospital. Hence, this study was to add to literature by assessing the association between the perceived usefulness of EHRs and quality of care among health providers at the 37 Military Hospital where there was a dearth of literature on the subject matter.

Various studies have been conducted to ascertain the perceived ease of use of the EHRs focusing primarily on the complexity of electronic health functions and the competencies of health personnel to understand them (Lluch, 2011; Akanbi et al., 2012; Biruk et al., 2014). It is obvious that not many studies have been conducted on how most of the staff, especially newly recruited ones, are finding it easy or otherwise to use the system at the hospital. Therefore, this study will fill the gap by establishing the association between the perceived ease of use of the EHRs and quality of care among health providers in the contexts of 37 Military Hospital and Ghana. Such an analysis is lacking in literature. Earlier studies were silent on this issue (Ampeah-Woode, 2019).

Notably, the success of the implementation of the EHRs depends on a positive attitude from health providers (Secginli, Erdogan & Monsen, 2014). However, it appears that limited studies exist on the behavior control of the electronic health records system with particular reference to the staff of the 37 Military Hospital. It was necessary that this factor was assessed to get a clearer picture of the situation. Consequently, this study will fill this gap by investigating the association between behavior control of the electronic health records system and the quality of care among health providers.

A lot of studies have explored patients' satisfaction with the electronic health records system as compared to the previously used paper-based health records system (Stewart, Kroth, Schuyler, & Bailey, 2010). However, these studies focused mostly on improvement of services as a way of determining patients' satisfaction in other jurisdictions (Jilka, Callahan, Sevdalis, Mayer, & Darzi, 2015). Nonetheless, there appeared to be no evidence of how the implementation of the EHRs had enhanced patients' satisfaction with the quality of healthcare at the hospital. This study will, however, determine the level of patients' satisfaction with the implementation of the electronic health records system at the 37 Military Hospital in Ghana.

Findings of this study are expected to enlighten the Ministry of Health, Ghana Health Service and other stakeholders in the health sector on the perceived merits of the implementation of the electronic health records system on delivering quality care to citizens. This enlightenment is expected to guide national policy on electronic health among other health policymakers while facilitating the necessary modifications required to accelerate the adoption and utilization of electronic health records in both private and public health facilities to deliver quality care.

Furthermore, the findings of this study are expected to inform the management of the 37 Military Hospital of the progress made in delivering quality care after the implementation of the EHRs since 2018 and consequentially form a solid foundation for further studies on the EHRs in Ghana.

The motivation for the conduct of this study stems from the experience of the researcher who is a health worker who has been associated with both paper-based health records and the EHRs in the health sector of Ghana. It is anticipated that the knowledge and experience acquired over the years will be useful in sharing lessons on the topic under consideration.

1.3. Objectives of the study

The objectives of the study have been grouped into general and specific as outlined below.

1.3.1. General Objective

Generally, the objective of the study was to assess the implementation of the electronic health records system on the quality of care/patient satisfaction at the 37 Military Hospital in Ghana.

1.3.2. Specific Objectives

The general objective of the study was achieved by addressing the subsequent precise objectives:

1. To determine the level of quality of care among the health providers/patients at the 37 Military Hospital.
2. To examine the association between individual (socio-demographic characteristics) factors and the quality of care.

3. To assess the association between the perceived usefulness of the EHRs and quality of care among health providers at the 37 Military Hospital.
4. To examine the association between the perceived ease of use of EHRs and quality of care among health providers at the 37 Military Hospital.
5. To investigate the association between behavior control of the EHRs and the quality of care among health providers at the 37 Military Hospital.
6. To determine patients' level of satisfaction with the implementation of the EHRs at the 37 Military Hospital.
7. To identify the challenges faced by health workers after the implementation of the EHRs.

1.3.3. Research Questions

The precise objectives were tackled by reacting to the following questions:

1. What is the level of quality of care among the health providers/patients at the 37 Military Hospital?
2. What is the association between individual (socio-demographic characteristics) factors and the quality of care?
3. What is the association between the perceived usefulness of the EHRs and quality of care among health providers at the 37 Military Hospital?
4. What is the association between the perceived ease of use of the EHRs and quality of care among health providers at the 37 Military Hospital?
5. What is the association between behavior control of the EHRs and the quality of care among health providers at the 37 Military Hospital?

6. What is the level of patients' satisfaction with the implementation of the EHRs at the 37 Military Hospital?
7. What are the challenges faced by health workers after the implementation of the EHRs?

1.4. Outline of the dissertation

The report of this dissertation has been outlined in chapters one to six. Chapter one is the introduction where the background, problem statement, justification, objectives and research questions have been outlined. Chapter two presents the literature review of related studies and conceptual framework underpinning the study. Chapter three presents the methods adopted to collect data. Chapter four presents the results as analyzed from the data collected. Chapter five presents the discussion of the comparison of findings of this study with existing literature. Chapter six is where the summary, conclusion and recommendations have been presented.

CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.0. Introduction

This chapter covers a review of related literature of studies conducted on the topic as well as the theoretical perspectives underpinning the conduct of this study. There are four sections. Section one focuses on studies on the quality of care. Section two encompasses studies on the electronic health records system in healthcare. Section three consists of theoretical perspectives adopted for the study. Section four outlines the conceptual framework of the implementation of the electronic health records system. There is a section on chapter summary where the key ideas have been presented with a direction of what to follow in the next chapter.

2.1. Quality of healthcare/patient satisfaction

Campbell, Roland and Buetow (2000) explained that quality of care denotes access to healthcare structures and processes of care which patients need and perceive as effective. Access implies the ease at which patients utilize health structures and the processes of care which they need while effectiveness is defined as whether the care received by a patient in the healthcare facility is effective.

Donabedian's (2005) model of quality of care formed the basis of the measurement of the quality of care in this study. This model was grounded on the measurement of three components which were structure, process and outcomes where each component had a direct influence on the next one (Haj, Lamrini & Rais, 2013).

This first component of the model focused on an assessment of the structure within which care was delivered, taking into consideration the availability of adequate facilities and equipment; the qualification and experience of health staff and the overall organizational structure (Donabedian, 2005).

The process considered the totality of activities taking place during the delivery of care to patients such as bodily checkup and diagnostic assessments, validation of diagnosis and therapy and technical proficiency in the conduct of diagnostic and therapeutic processes among others (Donabedian, 2005).

The outcome was assessed as the output of healthcare delivery such as recovery, enhanced patients' satisfaction or any other goals of care achieved (Donabedian, 2005).

Sometimes, there is a thin line between quality of care and patients' satisfaction. Some studies have noted that quality healthcare is dependent on patients' satisfaction with the service (Brooks-Carthon, Kutney-lee, Sloane, Cimiotti & Aiken, 2012; Bonyo, 2019). Gregory, Tevis, and Kent (2015) found that patients considered that satisfaction with their healthcare experiences was a sign of quality healthcare, attributing this to the fact that patients' satisfaction was dependent on favorable outcomes. Similarly, another study found that the quality of care in health institutions was linked to patients' satisfaction (Brooks-Carthon *et al*., 2012; Bonyo, 2019). A hypothetical procedure of Donabedian's (2005) model of quality of care is shown in figure 2.1.

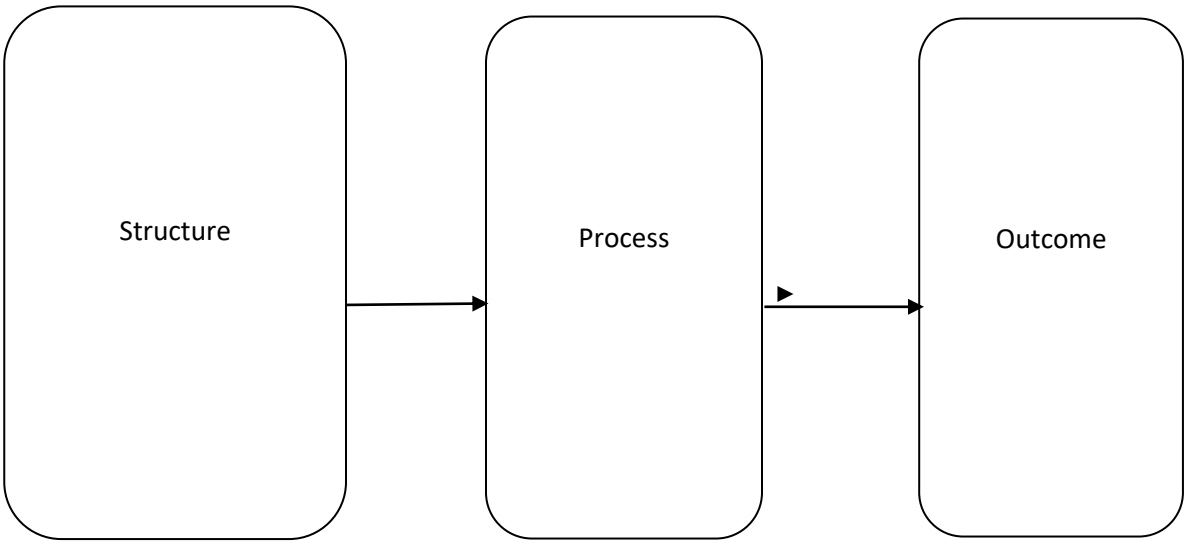

Figure 2.1: Hypothetical quality of care. Source: Donabedian (2005)

2.2. Electronic Health Records System in Healthcare

Health records, a term used to define records of a patient's medical history and care, have evolved to denote the inclusion of health and lifestyle information beyond just periodic medical visits (Evans, 2016). As indicated in chapter one, the development of computer technology in the 1960s and 1970s accelerated the transition from a paper-based health record system to the introduction of electronic health records system (Schopf et al., 2019). The introduction of electronic health records system was driven by the perceived merit of making a patient's medical information easy to access irrespective of their location in the world (Atasoy, 2019). The introduction of electronic health records system changed the layout of health records system and, accordingly, healthcare delivery (Evans, 2016).

Primarily, electronic health records were developed and piloted at several academic inpatient and outpatient medical facilities with features acceptable for physician entry of

commands, prescriptions, notes and data input which focused mostly on laboratory and medical examination (Mysen et al., 2016). However, the diffusion of EHRs was hindered by high costs, errors in data entry and initial skepticism of physicians, resulting in majority of healthcare organizations supplementing instead of replacing completely with the paper records system (Almulhem, 2012).

Eventually, large healthcare organizations began to acknowledge the importance of health information in electronic health records system in determining patterns of healthcare (Oliver et al., 2013). The increasing adoption of EHRs facilitated its reconfiguration to record and access patients' medical information online along with decision making tools and prescriptions (Koppel & Lehmann, 2015).

The evidence of EHRs' positive effects on the quality of care met diverse findings as the merits of the system varied according to different levels of usage and hospital characteristics in the United States of America (Lin, Lin, and Chen, 2019). Another study found that electronic health record usage was associated with a significantly greater quality of care in New York and United States (Kern, Barrón, Dhopeshwarkar, Edwards, & Kaushal, 2013).

2.3. Factors associated with EHRs and quality of care

This section presents analysis of studies that had studied the association between the implementation of EHRs and quality of healthcare. These have been presented under sub-themes such as individual (socio-demographic characteristics) factors and quality of

care; perceived usefulness of EHRs and quality of care; perceived ease of use of EHRs and quality of care; behavior control of EHRs and quality of care and level of patients' satisfaction with the implementation of EHRs.

2.3.1. Perceived benefits/usefulness of EHRs and quality of care

The electronic health records system has been noted to provide a standardized format for documentation of patients' medical information, providing easy access to and prompt retrieval of same when needed (DesRoches, Campbell, Rao & Donelan, 2008). Additionally, as noted in chapter one, this system has been acknowledged to provide detailed patient data, smoothening workflow and communication from one unit to another within a health facility and reducing hospital operational costs (Wali et al., 2020). Moreover, it has been perceived to save time, prevent loss of documents as associated with paper health records system and improve patients' participation during healthcare delivery, hence, promoting compliance with and satisfaction within the healthcare system (Vermeir et al., 2018).

Lin et al. (2019) found that although implementing EHRs had no significant quality impact, its meaningful use yielded a significant percentage point rise in the process of quality of care which further translated into significant societal merits in the United States.

2.3.2. Perceived ease of use of EHRs and quality of care

Electronic health records system was built with the objective of collecting, storing and displaying medical information for the delivery of quality healthcare (Abdekhoda, Dehnad & Zarei, 2019). However, Ammenwerth (2019) argues that the perceived merits associated with the implementation of the EHRs in health institutions will be null and void unless the technology is user-friendly and easy to use at the point of healthcare delivery.

Accordingly, Tubaishat (2017) suggested that the perceived ease of use of the EHRs in health institutions will be certain if health staff find the technology's human interface to be less frustrating and easy to access, understand and navigate with the inclusion of guidance in performing tasks and coded to avoid input of errors. It is only then that the electronic health records system can be perceived as an ideal alternative to replace the paper-based health records system in healthcare delivery (Tubaishat, 2017). Nevertheless, there are significant differences between health professional groups (physicians and nurses/midwives) in their perceptions of EHRs reducing paper-based records, data security in EHRs and costs of EHRs in Istanbul, Turkey (Secginli et al., 2014).

2.3.3. Behavior control of EHRs and quality of care

One of the essential factors to be considered when adopting electronic health records system is patients' privacy and security of their medical information (Kuse, Smith, Vanderlinden & Nealand, 2017). Kuse et al. (2017) explained that it is necessary for health institutions to develop policies, rules and regulations to guide health personnel's

control of EHRs in the process of healthcare delivery. Harman, Flite and Bond (2012) declared that the process of behavior control begins with the tasks and responsibilities of the health staff, the level of information they are entitled to and the reason for the retrieval of such information.

Health staff within a health institution will have access to patients' medical information, thus, need to fulfill their roles and responsibilities (Harman et al., 2012). For instance, nurses, laboratory assistants, pharmacists and doctors among others have very diverse roles and accountabilities. Therefore, they may not require access to the same medical information. However, health staff need to be aware that they are accountable for the use or misuse of a patient's medical information provided within the electronic health records system (Amatayakul, 2012).

2.3.4. Electronic Health Records System and Patients' Satisfaction

Ultimately, the development of EHRs was to maximize patients' satisfaction with healthcare delivery (Evans, 2016). Interestingly, findings of studies on patients' satisfaction and the use of electronic health records varies significantly (Mysen et al., 2016). Mysen et al. (2016) examined the perception of EHRs, communication with nurse practitioners during office visit and overall patients' satisfaction with office visit. This study observed that nurse practitioners provided more responsiveness to the patients than the computer through maintaining an eye contact while showing considerable concern and interest.

Rose, Richter and Kapustin (2015) also discovered that patients feel more involved and comfortable with health providers' use of electronic health records during visits, thereby, increasing their overall satisfaction. This was attributed to the fact that patients were encouraged to participate in documentation and discussion of medical information such as test results as recorded in electronic health records database.

Nevertheless, majority of the participants involved in a study remained neutral as to whether the use of electronic health records had a positive or negative impact on their overall satisfaction with healthcare delivery (Mysen et al., 2016). Interestingly, Yanamadala, Morrison, Curtin, McDonald, and Hernandez-Boussard (2016) observed that patients under medical and surgical care at hospitals with no EHRs had related satisfaction outputs as compared to patients under medical care at hospitals with a full implementation of EHRs in the United States.

2.4. Challenges faced by health professionals after the implementation of EHRs

Some health professionals continue to report several challenges with the electronic health records system due to its enormous interface that requires education and training to effectively navigate the features and functionalities during healthcare delivery (Evans, 2016). Stewart, Kroth, Schuyler and Bailey (2010) add that clinic workflows, lack of interoperability between EHRs, the need for training, culture changes, user resistance and errors were some of the challenges health professionals noted after the adoption of the EHRs in their health institutions.

Wali et al. (2020) opined that the use of the EHRs could cause health professionals to lose focus on patient-centered healthcare, thus, exploring patients' agenda, asking about concerns and discussing the effects of the health problem on a patient's life. Challenges such as lack of standardization, attitudinal and organizational constraints and poor EHRs design which were error-prone could endanger patients' safety and cause a decline in the quality of care in health institutions (Migdal, Namavar, Mosley & Afsar-Manesh, 2014).

Alanazi et al. (2020) reported that some health professionals found that the electronic health records system required a lengthy time to document health data; lacked the ability to display laboratory results; it was complex, hence, difficult to use; increased risk of making errors; unreliable due to the risk of power failure and very costly. Akanbi et al. (2012) added that increasing expenses on procurement and maintenance, poor network and lack of ease of use among health workers with the implementation of the system were challenges faced after its implementation. Alanazi et al. (2020) suggested that the EHRs should be completely sustained and measures put in place to curb the challenges faced by health workers with its use so as to maximize the delivery of quality of care.

2.5. Theoretical Framework

The study was guided by Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM) as presented below.

2.5.1. Theory of Planned Behavior

The Theory of Planned Behavior (TPB) was propounded by Ajzen (1991) to predict human behavior (Pourmand et al., 2020). The theory suggested that an individual's behavior was observable by their behavioral intentions and, under certain conditions, perceived behavior control. Accordingly, attitude, subjective norms and perceived behavioral control determine an individual's behavior intentions (Ajzen, 1991; Pourmand et al., 2020).

The key concepts of the theory included attitude: the degree to which an individual would assess their behavior with consideration to its outcome (Ajzen, 1991); subjective norm, an individual's view of a particular behavior — subjective to the verdict of others (Amjad & Wood, 2009) and perceived behavioral control: an individual's perceived ease or strain of fulfilling a certain behavior (Ajzen, 1991). The Theory of Planned Behavior has been functional in various fields, including healthcare, to understand and predict human behaviors (Pourmand et al, 2020).

2.5.2. Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) was established by Davis Bagozzi to enlighten on individuals' computer adoption behavior by drawing a causal linkage between two key principles of perceived ease of use and perceived usefulness and users' attitude, intentions and authentic computer adoption behavior (Bagozzi, 1989). Though initially used to generalize computer systems and their user population, the Technology Acceptance Model has been frequently used and cited in the field of healthcare since the

introduction of revolutionary technologies in health such as the electronic health records system (Holden & Karsh, 2010).

Technology Acceptance Model theorized that the perceived usefulness and perceived ease of use form the prime elements of users' intention to adopt any new technology or innovation (Bagozzi, 1989). Bagozzi (1989) explained that perceived usefulness denotes the extent to which a person believes that using a certain technology will advance job performance; and perceived ease of use denotes the extent to which a person believes that a specific technology will be effortless and easy to use. Tubaishat (2017) observed that the concrete implementation of the EHRs in health institutions will be affected by its acceptance which conversely will influence perceived usefulness and perceived ease of use.

This model enlightened on how the perceived usefulness and perceived ease of use of EHRs drove its acceptance and implementation at the 37 Military Hospital, especially considering health providers' and patients' perceptions of its implementation in delivering and accessing quality of care.

2.6. Conceptual framework of implementation of EHRs

Based on the chosen theoretical frameworks of Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM), the concept of quality of care and literature review, the conceptual framework in figure 2.2 was designed to guide the current study.

The conceptual framework postulated that the perception of quality of care among health providers and patients following the implementation of EHRs was influenced by their individual (socio-demographic characteristics) factors, perceived usefulness, perceived ease of use and behavior control of the system. However, patients' level of satisfaction with the implementation of the EHRs was the intermediary variable of quality of care.

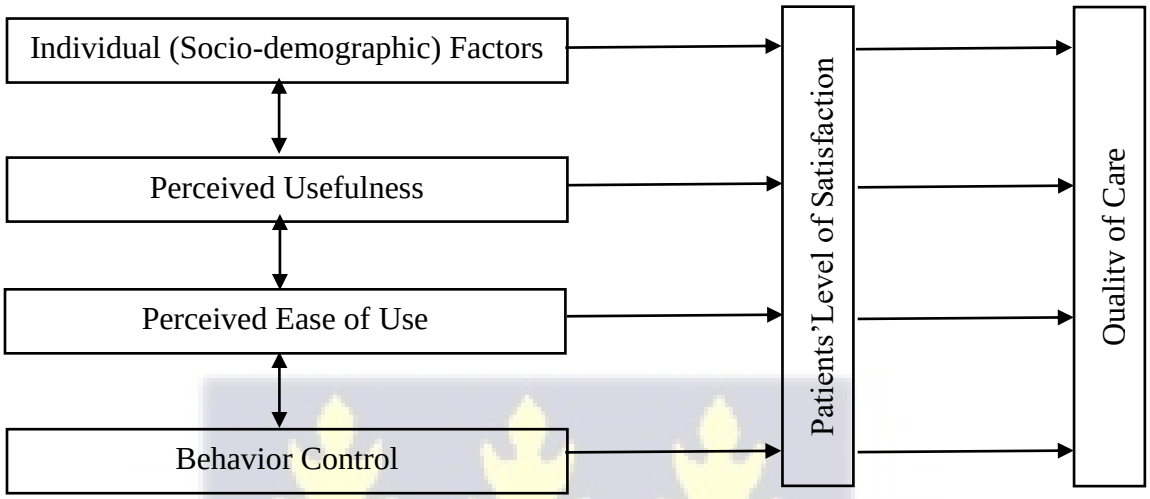

Figure 2.2: Conceptual framework of implementation of electronic health records system. Source: Researcher's construct based on TPB Ajzen (1991) and TAM (Bagozzi, 1989)

The gaps identified in literature showed that even as numerous studies had been conducted on other facets of the effect of the implementation of EHRs on the provision of healthcare, there was none that critically examined the linkage between the implementation of EHRs, patients' level of satisfaction and quality of care from the views of health providers and patients. Key areas of these gaps have been summarized under the justification of the study section in chapter one.

2.7. Chapter Summary

The chapter provided a literature analysis on quality of care, EHRs in healthcare and its perceived ease of use, perceived benefits/usefulness, behavior control and patients' satisfaction with the implementation of the EHRs. This chapter also presented a patient/client behavior theory and Technology Acceptance Model as the theoretical framework adopted for the study. The next chapter, which is chapter three, discusses the methods to be adopted in conducting this study.

CHAPTER THREE

METHODS

3.0. Introduction

The chapter covers a review of the methods adopted as well as the philosophical assumption underpinning the conduct of this study. There are eight sections. Section one consists of the philosophical assumption underpinning the study. Section two focuses on the study design. Section three outlines the study area. Section four outlines the study population. Section five focuses on the sampling strategies. Section six includes the study variables. Section seven focuses on data collection process and section eight covers ethical issues. There is a section on chapter summary where the main ideas are presented with a direction of what to follow in the next chapter.

3.1. Philosophical Assumption

The study was situated within the positivist philosophical assumption (Sauders, 2009). Sauders (2009) defined positivism as a philosophical stance which involved working with an observable social reality to produce a law-like generalization. The positivist philosophy promised unambiguous and accurate knowledge by focusing rigorously on scientific methods designed to generate pure data and facts which are not influenced by human understanding or bias (Sauders, 2009).

With positivists' research, the researcher is expected to remain neutral and be detached from the study and data in a value-free way with emphasis on quantifiable observations that will be subjected to statistical analysis in order to avoid influencing the findings of

the study (Gill & Johnson, 2010). The positivist approach has generated a number of criticisms for its rigid quest for a perfect standard of scientific methodology to produce an absolute theory of knowledge and trying to understand the society through quantitative methods of research, thereby, ignoring the extreme complexity of human interactions (Doina, 2020).

The positivist philosophical assumption was adopted for this study due to the choice of quantitative research method which informs the researcher to remain neutral in conducting the study to generate findings that accurately reflect the influence of the implementation of EHRs on quality of care at the 37 Military Hospital.

3.2. Study Design

This study embraced a case study research design which was an in-depth investigation of a research problem advantageous for testing whether a theory or model actually applies to that phenomenon in real life (Mills, Gabrielle & Eiden, 2010). Data for this study was from a primary source or administration of a questionnaire in a quantitative study. A case study research design has several inherent strengths which makes it the most preferred choice as compared to other competing research designs (Bhattacherjee, 2012). First and foremost, a case study can help deduce accurate, contextualized and a more reliable analysis of a phenomenon of interest by its ability to draw a rich range of data. Again, a case study can be used in either theory building or theory testing. Finally, with a case study research design, the phenomenon of interest can be studied from the individual or

organizational perspectives with the use of multiple levels of analyses (Bhattacherjee, 2012).

Therefore, this study was conducted at the 37 Military Hospital to investigate the influence of the implementation of EHRs on quality of care. The use of this research design and data collection tool (a questionnaire) was in alignment with the specific objectives of the study.

3.3. Study Area

The study was conducted at the 37 Military Hospital in the Ayawaso East Municipality of the Greater Accra Region.

Geography and demography

Ayawaso East Municipality is among the 29 districts/municipalities in the Greater Accra Region established by Legislative Instrument 2310 in 2017 with Nima as its capital town. The municipality has a population of about 130,256 by 2021 with a growth rate of 3.1% annually (Ministry of Finance (MoF), 2018).

Economy

Ayawaso East Municipality is characterized by commercial undertakings with a high demand for land for housing facilities (Ministry of Finance (MoF), 2018).

Healthcare provision

The municipality has one military hospital, one public clinic and seven community-based health planning and services (CHPS) zones. There are seven (7) private clinics and maternity homes providing healthcare services. Excluding the health staff at the 37 Military Hospital, the municipality has five (5) medical doctors, five (5) physician assistants, thirty seven (37) nurses and eleven (11) midwives making a total of fifty eight (58) medical professionals (Ministry of Finance (MoF), 2018).

The 37 Military Hospital

The 37 Military Hospital is the largest military hospital in Ghana after Korle-Bu Teaching Hospital. The label '37' is because it was the 37th military hospital to be built in the British colony of West Africa (Addo, 2016). Initially, the hospital provided treatment to only military staff but eventually opened its healthcare delivery service to the public. However, the hospital is staffed by both military and civilian personnel. The hospital migrated onto the electronic health records system in 2018 to serve its growing number of patients as well as to realize its objective of going paperless (Ampeah-Woode, 2019).

Service Provision

The 37 Military Hospital has the following departments/divisions which provides a perspective of the type of services rendered to patients. The units at the hospital include Accident and Emergency Department, Pharmacy, Dental, Radio Diagnosis, Radiography and X-Ray, Gynecology, Pediatrics, Veterinary, Surgical, Ophthalmology division, Renal Dialysis Unit and Health Training School (Electives Network, 2021). According to

Health Information Systems, the 37 Military Hospital has an average daily attendance of 762 patients.

Staffing

The hospital is primarily staffed by both military and civilian personnel and have healthcare workers in different job categories such as nurses, cleaners, laboratory staff, dental technicians, doctors, dentists, physician assistants, student doctors, public health officers, ward assistants, incinerator operators and laundry staff (Kommogldomo, 2016). The current staff data for the 37 Military Hospital is displayed in table 3.1 below.

Table 3.1: Staff distribution for 37 Military Hospital

Category	Frequency	Percentage
Officers	704	21%
Soldiers	1,136	33%
Civilians	1,593	46%
Total	**3,433**	**100%**

Source: General Headquarters of Medical Services (2021).

Funding / Financing

The main funding source for the hospital is through the Government of Ghana under the Ministry of Defense. Other funding sources includes National Health Insurance disbursement and cash payment by patients/Internally Generated Fund (IGF).

3.4. Study population

A study population is a collection of individuals who are randomly or purposively selected on the basis of inclusion and exclusion criteria which relates to the variable being studied (Lavrakas, 2008). Therefore, the study population includes 37 Military Hospital workers located in departments that operate the electronic health records system and patients seeking healthcare services at the hospital. The selected healthcare workers at the hospital have had significant exposure to the electronic health records system to provide information about its perceived ease of use, perceived usefulness, behavior control and patients' level of satisfaction with the implementation of the technology. They included doctors, nurses, laboratory technologists, medical records staff, pharmacists and patients among others.

3.4.1. Inclusion criteria

The study included healthcare workers who were operating or working with the electronic health records system in their various departments as well as patients attending the hospital at the time of data collection. They included doctors, nurses, laboratory technologists, medical records staff, pharmacists and patients who were aged from 18 years and above who accepted to be part of the study.

3.4.2. Exclusion criteria

The study excluded the following; cleaners, laundry staff or other auxiliary non-clinical healthcare workers who do not operate or work with EHRs in the course of their duties. It

excluded people who were below 18 years and those who do not want to be involved in the study.

3.5. Sampling strategies

The section presents the sample size and sampling methods applied to select participants into the study.

3.5.1. Sample size determination

Kish (1965) explained that the sample size determination is the action taken by a researcher to select the sum of observations to include in a statistical sample. Sample size is very indispensable in any empirical research which has the objective of making conclusions about a population from a sample (Bartlett, Kotrlik & Higgins, 2001).

Using Krejcie & Morgan (1970) sample determination formula: $S = X^2NP(1-P) \div d^2(N-1)+X^2P(1-P)$ where S = required sample size, X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841), N = the population size, P = the population proportion assumed to be 0.50 and d = the degree of accuracy expressed as a proportion (0.05).

Sample size for health workers at the 37 Military Hospital with total population of 3,000 was computed as 341 while sample size for patients with average daily attendance of 762 was computed as 248, giving a total sample size for this study as 589.

3.5.2. Sampling methods

Sampling is a procedure of choosing participants from a group or population to become the basis for assessing and forecasting the result of a population (Bhattacherjee, 2012). A multistage sampling strategy using purposive sampling and simple random sampling methods was used to sample the study participants.

Purposive sampling method

Polit and Tatano (2004) explained that purposive sampling method is the ability of a researcher to select participants who are particularly knowledgeable of the variables of interest to the researcher. Purposive sampling method is advantageous due to its time and cost effectiveness as participants who relate directly to the study are selected by the researcher. It also allows the researcher to generate a lot of information as the participants are knowledgeable of the variables of interests (Tongco, 2007). This sampling method has been criticized due to researcher bias identified with selection of participants which apparently is based on the judgment of the researcher (Gagapreet, 2017).

The health workers at the 37 Military Hospital were purposively sampled due to their knowledge of the electronic health records system to provide objective responses to the perceived ease of use, perceived usefulness, behavior control in delivering quality of care and patients' level of satisfaction with the implementation of the EHRs technology.

Simple random sampling method

Yates, Moore and Starnes (2008) defined simple random sampling method as a sampling technique where a subset of individuals are selected from a population randomly and entirely by chance. Simple random sampling method is advantageous because of its simplicity and unbiased random selection of a representative sample from a population (Gagapreet, 2017). The challenges associated with the application of this sampling method in quantitative study are the need for a complete and current list of all the members of a population (Gagapreet, 2017), time and the resources required to acquire this list for research purposes (Bhattacherjee, 2012).

Simple random sampling method was used to select patients at the 37 Military Hospital. They were selected at random and questionnaires were administered until the sample size for patients was attained. Patients available in the process of data collection had an equal chance of being chosen to be involved in the study.

The lottery method of sampling was applied where 'Yes' and 'No' were written on pieces of paper for selection of these staff. Those who selected 'Yes' were involved accordingly. The same strategy was applied to recruit patients who had completed their processes at the facility and voluntarily chosen to be involved in the study. A hospital exit interview approach was applied where research assistants positioned themselves at vantage points at the hospital. Patients who picked a 'Yes' were involved in the study until the sample size was reached.

3.6. Study Variables

Salkind (2010) explained that a variable in a research referred to a person, place, thing or phenomenon that a researcher was trying to measure. In application, this study assessed whether the implementation of electronic health records system was associated with quality of health care delivered and accessed at the 37 Military Hospital. The dependent and independent variables have been presented below.

3.6.1. Dependent Variable

The dependent variable studied was quality of care.

3.6.2. Independent Variables

The independent variables measured were:

1. Level of quality of care (measured by scoring).
2. Individual (socio-demographic characteristics) factors: age, sex, educational status, marital status, religion, rank and profession.
3. Perceived usefulness of EHRs.
4. Perceived ease of use of EHRs.
5. Behavior control of EHRs.
6. Patients' level of satisfaction with the implementation of EHRs (measured by scoring).

3.7. Data Collection – Questionnaire Design and Administration

Data for the study was acquired between August and December, 2021. Babbie (2010) enlightened that the quantitative method represented an impartial assessment or arithmetical analysis of data acquired through polls, questionnaires or through the use of secondary statistical data. Thus, the quantitative research method focused on gathering numerical data to generalize a wider population or to explain a particular phenomenon (Babbie, 2010). Quantitative method has several inherent strengths, hence, its adoption for this study. First and foremost, this method makes generalization possible due to the use of scientific processes for data acquisition and analysis. Additionally, the issue of bias is eliminated as the researcher is not directly in contact with the participants of the study in the process of data collection. Lastly, the use of numerical data for description and analysis saves the researcher time and resources (Eyisi, 2016).

Two sets of questionnaires were designed by the researcher for this study; a questionnaire designed for health workers using the EHRs and patients at the 37 Military Hospital. The questionnaire designed for health workers had six sections that were measured using Likert scale as 1 = strongly disagree/weak to 5 = strongly agree/excellent on the level of quality of care, perceived ease of use, perceived usefulness, behavior control and patients' level of satisfaction with the implementation of the EHRs at the 37 Military Hospital.

The questionnaire designed for patients also measured the level of quality of care among health providers and their level of satisfaction with the implementation of the EHRs at the

37 Military Hospital. The two sets of questionnaires were answered by the participants using both self-administered strategy and interviewer-administered strategy depending on the educational background of the participant, especially the patients. Health workers devoted ten minutes while patients devoted five minutes to answering each questionnaire. The researcher and her research assistants approached the health workers in their various departments. For patients, data collection was done through hospital exit interviews.

3.7.1. Quality assurance

Two research assistants were involved in the administration of the questionnaires at the 37 Military Hospital and helped in clarifying issues that arose from the participants as well. This guaranteed the quality of data collection.

3.7.2. Training of research assistants

A two-day training workshop was provided to train the two research assistants on the objectives and how to respond to questions from participants.

3.7.3. Pretesting

The questionnaires were pretested at the University of Ghana Hospital to detect and correct ambiguously worded questions or issues that might result in biased answers before the main data collection process began. The questionnaires were administered to the healthcare workers at the hospital before its use for the main study at the 37 Military Hospital.

3.7.4. Validity and Reliability

Validity and reliability were two concepts adopted to appraise the quality of research as they indicated how profound a method, technique or test measured approximately (Fiona, 2020). Validity denotes whether the data collection instrument measured the behavior or quality it anticipated to measure and how sound the instrument performed this assessment (Anastasi & Urbina, 1997). Validity was obtained through a significant and proper analysis of data obtained from the data collection tool together with the outcomes of analyses (Surucu & Maslakei, 2020).

To determine the validity of the data collection tool (questionnaire), the researcher adopted the content type of validity. Bollen (1989) explained that content validity is a subjective form of validity that evaluates whether the expressions presented in a data collection instrument represent the phenomenon the researcher intended to measure. Therefore, the researcher evaluated the content of the data collection instrument (questionnaire) to ensure that the specific objectives were covered and measured accordingly. Furthermore, the researcher obtained opinions from her supervisor and other health experts to determine content validity of the questionnaire before administration.

Reliability refers to the consistency of measurement, thus, the ability to obtain the same results by using the same methods under the same circumstances (Fiona, 2020). Surucu and Maslakei (2020) deduce that a strong positive correlation between the results of the measuring instrument signifies an indication of reliability. Therefore, the researcher tested the reliability of the data collection instrument (questionnaire) by analyzing the

questionnaire data of the pretesting phase against the questionnaire data of the main study. This was due to the observation that University of Ghana Hospital had also implemented the electronic health records system to deliver quality of care, hence, an expectation of generating similar results as an indication of consistency of the questionnaire as the data collection tool.

3.7.5. Data processing and analysis

Data preparation processes (data coding, entry) were applied to analyze the quantitative data collected as the association between the independent variables and dependent variable using simple descriptive statistics. The questionnaire data was scrutinized to check double responses or errors before entering the completed questionnaires into STATA version 14.0 for analysis. The researcher used Chi-square test and logistic regression analysis to assess the association between quality of care as a dependent variable and the perceived ease of use, perceived usefulness and behavioral control as independent variables.

Accordingly, any independent variable with a p-value more than 0.05 ($p>0.05$) cannot be classified as significantly associated with the outcome variable while any independent variable with p-value less than 0.05 ($p<0.05$) was significantly associated with the outcome variable. The interpretation of level of quality of care and patients' level of satisfaction with the implementation of the EHRs was done using mean scores where 4.5 – 5.00 = excellent, 3.5 – 4.49 = very good, 2.5 – 3.49 = good, 1.5 – 2.49 = fair and scores below 1.5 = poor.

Chi-square test is a statistical test which measures the association between two categorical variables (Ugoni & Walker, 1995; McHugh, 2013). McHugh (2013) educated that distinct from several statistics, the Chi-square test could deliver information not only on the significance of any observed differences but also comprehensive information on precisely which categories accounted for any differences discovered. In application, the researcher used Chi-square test to analyze the association between the independent variables (perceived usefulness, perceived ease of use, behavior control and patients' level of satisfaction) and dependent variable (quality of care).

Freedman (2009) explains that logistic regression analysis studies the link between a dependent variable and a given set of independent variables. Logistic regression analysis is advantageous in avoiding confounding effects when analyzing the association between variables together (Sperandei, 2014).

3.8. Ethical Considerations

Ethical principles such as anonymity, confidentiality and neutrality were strictly adhered to in the conduct of this study. Additionally, participants were enlightened on the objectives of the study and voluntarily chosen to participate in the research. Moreover, similar studies by scholars adopted in the study were duly acknowledged to avoid plagiarism. The following ethical principles were observed in the conduct of the study.

Ethical clearance

Ethical clearance for the study was obtained from the Institutional Review Board of the 37 Military Hospital with reference number: 37MH-IRB/MAS/IPN/513/2021 (See Appendix A).

Permission from the study site

Permission was sought from management of the 37 Military Hospital before the commencement of the study.

Participants' consent

Consent was acquired from the participants before their participation in the study. Participants were presented with "Yes" or "No" responses on pieces of paper and those who selected 'Yes' were involved accordingly.

Risks and benefits

There was no risk associated with participant's involvement in the study.

Confidentiality and anonymity

Participants did not write their names on the questionnaire. Therefore, no responses were linked to their identities.

Voluntary withdrawal

Participants were made to understand that their participation in the study was voluntary and they could withdraw or decline to respond to the questionnaire at any time and without penalty.

Compensation

There was no compensation for participation in the study.

COVID-19 Protocol

The researcher and her two research assistants adhered strictly to COVID-19 protocols by wearing a nose mask and avoiding close contact with the participants of the study. The researcher provided hand sanitizers as the hospital already provided Veronica buckets and liquid soap at vantage locations.

Data storage and usage

The researcher was solely responsible for the storage of the questionnaire data and ensured the data was used only within the context of the study. The hard copies of the returned questionnaires were preserved in a locked up cabinet while soft copies of the reports were saved on the researcher's personal computer only to be accessed via a password. All data will be burnt and discarded after five years post publication of the study.

Results dissemination

The final report of the study was circulated through University of Ghana, School of Health and Management of 37 Military Hospital. Manuscripts were also prepared from the results for publication in appropriate peer reviewed journals.

Conflict of interest

There was no conflict of interest in the conduct of this study.

Funding

The study was fully financed by the researcher without any third party support.

3.9. Chapter Summary

This chapter provided a review of the methods adopted to acquire data for analysis in this study as well as the philosophical underpinnings underlying the rationale of research method. It presented sub-sections such as study design, study population, sampling strategies, study variables and data collection (questionnaire design and administration). This chapter also presented ethical issues in the conduct of this study. The next chapter, which is chapter four, presents the findings of the study.

CHAPTER FOUR

RESULTS

4.0. Introduction

This chapter outlines the data acquired from questionnaires designed in alignment with the objectives of the study. The analysis begins with demographic features of health workers and patients, the level of quality of care, association between socio-demographic characteristics of the health workers at the 37 Military Hospital and quality of care, perceived usefulness of EHRs and quality of care, association between perceived ease of use and quality of care and association between behavioral control and quality of care and patients' level of satisfaction with the implementation of EHRs at the 37 Military Hospital. The chapter ends with a summary where key ideas are summed up with a direction of what the next chapter presents.

4.1. Socio-Demographic Characteristics

This section presents descriptive statistics of the respondents involved in the study who are health workers and patients at the 37 Military Hospital.

4.1.1. Socio-Demographic Characteristics of Health Workers at the 37 Military Hospital

A total of 341 questionnaires were administered out of which 336 were retrieved from the field, giving 98.5% rate of return for the health workers at the 37 Military Hospital. The results showed that 212 (63.1%) of the health workers were female and 124 (36.9%) were male. It was observed that 326 (97.0%) fell within 21 and 40 years age category. In

addition, 196 (58.3%) had degree as their highest educational level while 122 (36.3%) had diploma as their highest educational level.

The results showed that 244 (72.6%) were single and 86 (25.6%) were married. Also, 292 (86.9%) had Christianity as their religious background. Additionally, the results showed that 94 (27.9%) had less than a year's experience, 68 (20.2%) had 3 years' experience and 64 (19.1%) had 2 years' experience with electronic health records system. Additionally, 210 (62.5%) of the health workers used electronic health records system to update/create patients' file/records, 48 (14.3%) used it for diagnosis, 32 (9.5%) used it for laboratory test results and 30 (8.9%) used it for documentation of health services rendered to patients. The results of the socio-demographic features of health workers at the 37 Military Hospital are shown in table 4.1.

Table 4.1: Socio-Demographic Characteristics of Health Workers at 37 Military Hospital (N=336)

Characteristics	Frequency	Percentage (%)
Gender		
Male	124	36.9
Female	212	63.1
Age Category		
Less than 20 years	6	1.8
21 – 40 years	326	97.0
41 – 60 years	4	1.2
Highest Educational Level		
Diploma	122	36.3
Degree	196	58.3
Masters	8	2.4
Doctorate	6	1.8
No response	4	1.2
Marital Status		
Single	244	72.6
Married	86	25.6
Divorced	4	1.2

No response	2	0.6
Religion		
Christianity	292	86.9
Islamic	36	10.7
Traditional	2	0.6
No response	6	1.8
Experience		
Less than a year	94	27.9
1 year	54	16.1
2 year	64	19.1
3 year	68	20.2
More than 3 years	52	15.5
No response	4	1.2
Task		
Update/creation of patients' file records	210	62.5
Diagnosis	48	14.3
Laboratory test results	32	9.5
Prescription	12	3.6
Documentation of services rendered	30	8.9
No response	4	1.2

4.1.2. Socio-Demographic Characteristics of Patients at the 37 Military Hospital

A total of 248 questionnaires were administered out of which 228 were retrieved from the field, giving 91.9% rate of return for the patients at the 37 Military Hospital. The results revealed that 126 (55.3%) of the patients involved in the study were females and 102 (44.7%) were males. Additionally, 120 (52.6%) fell within 21 and 40 years age category and 66 (28.9%) fell within 41 and 60 years age category. It was also observed that 72 (31.5%) had senior high school as their highest educational level and 48 (21.1%) had degree as their highest educational level. A total of 66 (28.9%) were self-employed, 42 (18.4%) were civil servants and 30 (13.2%) were unemployed. Additionally, 96 (42.1%) had been visiting the 37 Military Hospital for more than 10 years while 78 (34.2%) had

been visiting the health facility within 5 to 9 years. The results of the socio-demographic features of the patients at the 37 Military Hospital are shown in table 4.2.

Table 4.2: Socio-Demographic Characteristics of Patients at the 37 Military Hospital (N=228)

Characteristics	Frequency	Percentage (%)
Gender		
Male	102	44.7
Female	126	55.3
Age Category		
Less than 20 years	12	5.3
21-40 years	120	52.6
41-60	66	28.9
Above 60 years	30	13.2
Highest Educational Level		
Primary School	12	5.3
Junior High School	30	13.2
Senior High School	72	31.5
Diploma	42	18.4
Degree	48	21.1
Masters	24	10.5
Occupation		
Civil Engineer	6	2.6
Student	24	10.5
Sound Engineer	6	2.6
Accountant	6	2.6
Civil Servant	42	18.4
Self Employed	66	28.9
Unemployed	30	13.2
Lecturer	6	2.6
Journalist	6	2.6
Retired Worker	12	5.3
Nurse	6	2.6
Teacher	12	5.3
Architect	6	2.6
Frequency of visit to 37 Military Hospital		
Less than a year	12	5.3
1-4 years	42	18.4
5-9 years	78	34.2
Above 10 years	96	42.1

4.2. Level of Quality of Care

This section covers the findings on the level of quality of care. The level of quality of care at the 37 Military Hospital was measured by scoring each component of quality of care using a Likert scale. Univariate analysis was adopted to assess the performance of the hospital in terms of attention to patients, responsiveness to emergencies, communication and efficiency of services rendered among others. The dimension of level of quality of care was computed using mean and standard deviation. The interpretations for the mean scores and Likert scale are shown in table 4.3.

Table 4.3: Interpretation of mean scores and Likert scale

Mean Scores		Scale	Weight
4.5 – 5.00	Excellent	Excellent	5
3.5 – 4.49	Very Good	Very Good	4
2.5 – 3.49	Good	Neutral	3
1.5 – 2.49	Fair	Fair	2
Below 1.5	Poor	Weak	1

The above were used to measure the level of quality of care among both patients and health providers as presented below.

4.2.1. Level of Quality of Care among both patients and health providers at the 37 Military Hospital

The results showed that the 37 Military Hospital was assessed by patients to be very good in respect of attention to patients' need (M=3.68, SD=0.525), responsiveness of health providers to emergencies (M=3.81, SD=0.651), efficiency of services rendered (M=3.78, SD=0.576), timeliness of healthcare (M=3.78, SD=0.576) and general patients' care

(M=3.86, SD=0.528). Additionally, the hospital was assessed to be good in terms of patient-provider communication (M=3.42, SD=0.683). The overall level of quality of care was assessed to be very good (M=4.02, SD=0.683). The results are detailed in table 4.4.

The 37 Military Hospital was also assessed by health providers to be good in terms of adequate staffing (M=2.94, SD=1.007), effective administrative structure to deliver quality of care (M=3.20, SD=0.919), serene hospital environment (M=3.34, SD=1.04) and adequate medical equipment to provide quality of care (M=2.88, SD=1.02). In addition, the results revealed that overall level of quality of care was assessed to be good (M= 3.36, SD=0.898). The results of the level of quality of care as measured by both patients and health workers at the 37 Military Hospital are displayed in table 4.4 below.

Table 4.4: Level of Quality of Care among both patients and health workers at the 37 Military Hospital (N=564)

Dimension of Level of Quality of Care	Mean	Std. D
Patients (N=228)		
Attention to patients' health needs	3.68	0.525
Responsiveness of health providers to emergencies	3.81	0.651
Patient–Provider Communication	3.42	0.683
Efficiency of services rendered	3.78	0.576
Timeliness of healthcare	3.78	0.576
General patients' care at the hospital	3.86	0.528
Overall level of quality of care	4.02	0.636
Health Workers (N=336)		
Adequate staffing	2.94	1.007
Effective administrative structure to deliver quality of care	3.20	0.919

Serene hospital environment	3.34	1.04
Adequate medical equipment to provide quality of care	2.88	1.02
Overall level of quality of care	3.36	0.898

4.3. Chi-square analysis: Association between health workers' (socio-demographic characteristics) factors and quality of care

This section presents results of the association between health workers' (socio-demographic characteristics) elements and quality of care. The results revealed that gender (x^2= 1.1232, p=0.570), age (x^2= 2.2793, p=0.685), educational level (x^2= 0.9315, p=0.628), marital status (x^2= 2.3195, p=0.888), religion (x^2= 4.1342, p=0.659) and rank (x^2= 27.9579, p=0.361) were not significantly linked with the level of quality of care. However, the experiences of health workers (x^2= 19.8814, p=0.011) was significantly connected with quality of care. The results of the association between health workers' (socio-demographic characteristics) elements and the level of quality of care at the 37 Military Hospital are detailed in Table 4.5.

Table 4.5: Chi-square analysis: Association between health workers' (socio-demographic characteristics) factors and quality of care (N=336)

Characteristics	Frequency	Percentage (%)	X^2	P Value
Gender			1.1232	0.570
Male	124	36.9		
Female	212	63.1		
Age Category			2.2793	0.685
Less than 20 years	6	1.8		
21 – 40 years	326	97.0		
41 – 60 years	4	1.2		
Educational Level			0.9315	0.628
Diploma	122	36.3		

Degree	196	58.3		
Masters	8	2.4		
Doctorate	6	1.8		
No response	4	1.2		
Marital Status			2.3195	0.888
Single	244	72.6		
Married	86	25.6		
Divorced	4	1.2		
No response	2	0.6		
Religion				
Christianity	292	86.9	4.1342	0.659
Islamic	36	10.7		
Traditional	2	0.6		
No response	6	1.8		
Experience			19.8814	0.011
Less than a year	94	27.9		
1 year	54	16.1		
2 year	64	19.1		
3 year	68	20.2		
More than 3 years	52	15.5		
No response	4	1.2		
Rank			27.9576	0.361
House Officer	24	7.1		
Senior Staff Midwife	20	5.9		
Principal Nursing Officer	12	3.6		
Pharmacy Technician	20	5.9		
Staff Nurse	100	29.8		
Laboratory Technician	18	5.3		
Senior Nursing Officer	72	21.4		
Senior Pharmacy Technician	10	2.9		
Medical Officer	8	2.4		
Civilian	34	10.1		
Military	6	1.8		
Nursing Assistant	6	1.8		
Warrant Officer Class II	6	1.8		

4.4. Chi-square analysis: Association between patients' (socio-demographic characteristics) factors and quality of care

This section presents results of the association between patients' (socio-demographic characteristics) elements and quality of care. The results revealed that gender (x^2= 0.9183, p=0.632), age (x^2= 4.6088, p=0.595), educational level (x^2= 8.6398, p=0.577) and occupation (x^2= 24.1939, p=0.451) were not significantly linked with the level of quality of care. However, the frequency of patients' visit to the health facility (x^2= 12.6290, p=0.049) was significantly connected with quality of care. The results of the association between patients' (socio demographic characteristics) factors and the level of quality of care at the 37 Military Hospital are detailed in Table 4.6.

Table 4.6: Chi-square analysis: Association between patients' (socio-demographic characteristics) factors and quality of care (N=228)

Characteristics	Frequency	Percentage (%)	X^2	P value
Gender			0.9183	0.632
Male	102	44.7		
Female	126	55.3		
Age Category			4.6088	0.595
Less than 20 years	12	5.3		
21-40 years	120	52.6		
41-60	66	28.9		
Above 60 years	30	13.2		
Highest Educational Level			8.6398	0.577
Primary School	12	5.3		
Junior High School	30	13.2		
Senior High School	72	31.5		
Diploma	42	18.4		
Degree	48	21.1		
Masters	24	10.5		
Occupation			24.1939	0.451

Civil Engineer	6	2.6		
Student	24	10.5		
Sound Engineer	6	2.6		
Accountant	6	2.6		
Civil Servant	42	18.4		
Self Employed	66	28.9		
Unemployed	30	13.2		
Lecturer	6	2.6		
Journalist	6	2.6		
Retired Worker	12	5.3		
Nurse	6	2.6		
Teacher	12	5.3		
Architect	6	2.6		
Frequency of visit to 37 Military Hospital			12.6290	0.049
Less than a year	12	5.3		
1-4 years	42	18.4		
5-9 years	78	34.2		
Above 10 years	96	42.1		

4.5. Chi-square analysis: Association between perceived usefulness of EHRs and quality of care among health workers at the 37 Military Hospital

This section presents results of the association between perceived usefulness of electronic health records system and quality of care. The results revealed that the perceived usefulness of EHRs in terms of difficulty to perform without EHRs (x^2= 49.050, p=0.000), improvement of job performance (x^2= 98.783, p=0.000), addressing job-related needs (x^2= 70.810, p=0.000), enhancement of job effectiveness (x^2= 63.576, p=0.000), accomplishment of tasks (x^2= 53.269, p=0.000), improvement of quality of work (x^2= 111.899, p=0.000), attending to patients quickly and effectively (x^2= 146.383, p=0.000), saving time (x^2= 95.565, p=0.000), providing greater control over work (x^2= 169.975, p=0.000) and overall level of perceived usefulness of electronic health records system

(x^2= 30.322, p=0.016) were significantly associated with the quality of care among health workers at the 37 Military Hospital. The results of the association between perceived usefulness of EHRs and quality of care are detailed in table 4.7 below.

Table 4.7: Chi-square analysis: Association between perceived usefulness of electronic health records system and quality of care among health workers at the 37 Military Hospital (N=336)

Statement	Strongly disagree/ disagree N (%)	Unsure N (%)	Strongly agree/agree N (%)	X^2	P Value
Difficult to perform without EHRs	100(29.8)	46(13.7)	190 (56.5)	49.050	0.000
EHRs improves job performance	30 (8.9)	32 (9.5)	274 (81.6)	98.783	0.000
EHRs addresses job-related needs	46 (13.7)	82 (24.4)	208 (61.9)	70.810	0.000
EHRs enhances job effectiveness	36 (10.7)	56 (16.7)	244 (72.6)	63.576	0.000
EHR helps accomplish tasks quickly	36 (10.7)	52 (15.5)	248 (73.8)	53.269	0.000
EHRs improves quality of work	52 (15.5)	66 (19.6)	218 (64.9)	111.899	0.000
EHRs helps workers attend to patients more quickly and effectively	68 (20.3)	60 (18.0)	206 (61.7)	146.383	0.000
EHRs saves time	60 (17.9)	24 (7.1)	252 (75)	95.565	0.000
EHRs gives workers greater control over their work	46 (13.7)	74 (22.0)	216 (64.3)	169.975	0.000
Overall level of perceived usefulness in delivering quality of care	12 (3.6)	52 (15.5)	272 (80.9)	60.322	0.016

4.6. Chi-square analysis: Association between perceived ease of use of the EHRs and quality of care among health workers at the 37 Military Hospital

This section presents results of the association between perceived ease of use of EHRs and quality of care. The results revealed that the perceived ease of use of the EHRs in terms of less confusion with the EHRs (x^2= 43.612, p=0.002), less frustrating human interface (x^2= 37.081, p=0.011), ease of use (x^2= 73.401, p=0.000), less consultation with user manual (x^2= 35.855, p=0.000), helpful guidance (x^2= 63.030, p=0.000), flexibility (x^2=49.312, p=0.000), software crashes (x^2= 45.110, p=0.001), ease of correction (x^2= 41.378, p=0.003) and overall level of perceived ease of use of the EHRs (x^2= 53.212, p=0.000) were significantly associated with quality of care among health workers at the 37 Military Hospital. However, the result showed that making errors frequently when using the electronic health records system (x^2= 30.477, p=0.062) was not significantly associated with quality of care. The results of the association between perceived ease of use of the EHRs among health workers and quality of care are described in table 4.8 below.

Table 4.8: Chi-square analysis: Association between perceived ease of use of the EHRs and quality of care among health workers at the 37 Military Hospital (N=336)

Statement	Strongly disagree/ disagree N (%)	Unsure N (%)	Strongly agree/agree N (%)	X^2	P Value
Confused when using EHRs	246 (73.2)	42 (12.5)	48 (14.3)	43.612	0.002
Frequent errors when using EHRs	248 (73.8)	34 (10.1)	54 (16.1)	30.477	0.062
The human interface of EHRs is often frustrating	248 (43.5)	34 (26.7)	54 (29.8)	37.081	0.011
EHRs is easy to use	90 (26.8)	38 (11.3)	208 (61.9)	73.401	0.000

Consult user manual when using EHRs	228 (67.9)	38 (11.3)	70 (20.8)	35.588	0.017
EHRs provides helpful guidance	68 (20.2)	46 (13.7)	222 (66.1)	63.030	0.000
EHRs is too rigid and inflexible	198 (58.9)	70 (20.8)	68 (20.3)	49.312	0.000
EHRs often experiences software crashes	62 (18.5)	92 (27.3)	182 (54.2)	45.110	0.001
Errors are easy to correct with EHRs	122 (36.3)	44 (13.1)	170 (50.6)	41.378	0.003
Overall level of perceived ease of use	30 (8.9)	64 (19.1)	242 (72.0)	53.212	0.000

4.7. Chi-square analysis: Association between behavior control of the EHRs and quality of care among health workers at the 37 Military Hospital

This section presents results of the association between behavior control of electronic health records system and quality of care. The results revealed that the behavior control of EHRs in terms of accessibility to the same information on EHRs (x^2= 33.645, p=0.029), regulations and rules that guide control of EHRs (x^2= 60.191, p=0.000), accountability for the use or misuse of patients medical information (x^2= 106.727, p=0.000), prompt detection of unauthorized access to patient's medical information (x^2= 57.466, p=0.000) and overall level of perceived ease of use of the electronic health records system (x^2= 54.055, p=0.000) were significantly associated with quality of care among health workers at the 37 Military Hospital. The results of the association between behavior control of the electronic health records system among health workers and quality of care are indicated in table 4.9 below.

Table 4.9: Chi square analysis: Association between Behaviour Control of the electronic health records system and quality of care among health workers at the 37 Military Hospital (n=336)

Statement	Strongly disagree/ disagree (%)	Unsure (%)	Strongly agree/agree (%)	X^2	P Value
All healthcare workers have access to the same information on EHRs	114 (33.9)	52 (15.5)	170 (50.6)	33.645	0.029
There are regulations and rules that guide control of EHRs at the hospital	16 (4.8)	58 (17.3)	262 (77.9)	60.191	0.000
Workers are accountable for the use or misuse of a patient's medical information	18 (5.4)	40 (11.9)	278 (82.7)	106.72	0.000
Detection of unauthorized access to patient's medical information	70 (20.8)	156 (46.5)	110 (32.7)	57.466	0.000
Overall level of behavioral control	16 (4.8)	110 (32.7)	210 (62.5)	54.055	0.000

4.8. Patients' level of satisfaction with the implementation of electronic health records system at the 37 Military Hospital

This section focuses on the results of the analysis of the patients' level of satisfaction with the implementation of EHRs from the perspective of both health workers and patients at the 37 Military Hospital.

4.8.1. Health workers' perspective of patients' level of satisfaction with the implementation of EHRs at the 37 Military Hospital

The results revealed that 54.7% of the health workers at the 37 Military Hospital were neutral as to whether the implementation of EHRs reduced patients' waiting time (M=2.77, SD=0.99). Moreover, 52.9% were neutral as to whether the implementation of EHRs system facilitated patients' involvement with the health provider at the hospital (M=3.11, 0.94). Additionally, 43.7% of the health workers were neutral as to whether the implementation of the electronic health records system facilitated communication with patients (M=3.11, SD=1.08). In addition, 52.9% of the health workers viewed accessibility to laboratory and diagnostic test results to be very good (M=3.36, SD=1.19). The results showed that 36.9% of health workers indicated that the overall patients' level of satisfaction with the implementation of EHRs at the 37 Military Hospital was very good (M=3.23, SD=0.98). The results of health workers' perspective of patients' level of satisfaction with the implementation of EHRs are displayed in table 4.10 below.

Table 4.10: Health workers' perspective of patients' level of satisfaction with the implementation of EHRs at the 37 Military Hospital (n=336)

Statement	Responses (%) (Weak, Fair, Neutral, Very Good, Excellent)						
	W	F	N	V. G	E	M	SD
Reduced patients' waiting time	7.14	19.1	54.7	17.3	1.8	2.77	0.99
Involvement with health provider		14.3	52.9	29.2	3.6	3.11	0.94
Accessibility to laboratory and diagnostic test results	4.8	6.6	31.2	47.6	9.8	3.36	1.19
Communication with patient	2.4	13.2	43.7	37.1	3.6	3.11	1.08

Overall patients' level of satisfaction with EHRs	0.6	10.7	47.0	36.9	4.8	3.23	0.98

4.8.2. Patients' perspective of level of satisfaction with the implementation of the EHRs at the 37 Military Hospital

From the results, 92.1% of patients at the 37 Military Hospital confirmed that the implementation of EHRs reduced waiting time for services (M=4.32, SD=0.93) and 52.6% concurred that they received more attention from health providers at the hospital after the implementation of the EHRs (M=3.29, SD=0.98). Furthermore, 87% of the patients indicated that their diagnosis and laboratory results were quickly processed and communicated to other departments after the implementation of EHRs (M=4.0, SD=0.87) and 60.5% confirmed an improvement in health provider-patient relationship (M=3.63, SD=1.05). In addition, 84.2% of the patients indicated that they will frequently seek treatment at the hospital due to improvement in health services after the implementation of EHRs (M=3.89, SD=0.95). Furthermore, 71% of the patients confirmed their overall level of satisfaction with the implementation of EHRs at the 37 Military Hospital (M=3.73, SD=0.86). The results of patients' perspective of their level of satisfaction with the implementation of EHRs are displayed in table 4.11 below.

Table 4.11: Patients' perspective on their level of satisfaction with the implementation of EHRs at the 37 Military Hospital (n=228)

Statement	Strongly disagree/ disagree (%)	Unsure (%)	Strongly agree/agree (%)	Mean	SD
Reduced waiting time for services	0	7.8	92.1	4.32	0.93
Received more attention from health providers	18.4	29.0	52.6	3.29	0.98
Diagnosis and laboratory test results are processed quickly and communicated to other departments	0	13.0	87.0	4.0	0.87
Improvement of health provider-patient relationship	7.9	31.6	60.5	3.63	1.05
Frequent treatment at the hospital due to improvement of service after the implementation of EHRs	5.3	10.5	84.2	3.89	0.95
Overall level of satisfaction on the implementation of EHRs	0	29.0	71.0	3.73	0.86

4.9. Challenges faced by health workers after the implementation of EHRs among health workers at the 37 Military Hospital

This section presents results of the types of challenges faced by health workers after the implementation of the EHRs at the 37 Military Hospital. The results showed that 86 (41%) of the health workers indicated that poor network was a challenge faced after the implementation of EHRs and 60 (28.5%) noted that lack of backup power to run the EHRs during power outage was a challenge. Additionally, 20 (9.5%) of the health workers indicated that difficulty in retrieving saved patients' medical records was a

challenge. Additionally, 16 (7.6%) stated that limited availability of electronic devices to run the EHRs was a challenge. Moreover, majority (210 (62.5%)) of the health workers confirmed their overall level of challenges with the electronic health records system. The results of the challenges faced by health workers after the implementation of the EHRs are shown in table 4.12 below.

Table 4.12: Challenges faced by health workers after the implementation of EHRs among health workers at the 37 Military Hospital (n=210)

Challenges	Frequency	Percentage (%)
Poor network	86	41.0
Limited availability of electronic devices to run EHRs	16	7.6
Difficulty in displaying patients' medical/laboratory reports	12	5.7
Difficulty in retrieving saved patients' medical records	20	9.5
Delay in the transmission of medical result across units	6	2.9
Lack of backup power to run EHRs during power outage	60	28.5
Difficulty in correcting saved patients' medical records	10	4.8
Overall level of challenges with EHR system	210	62.7

4.10. Regression Analysis: Association between Perceived Ease of Use, Perceived Usefulness, Behavior Control and Patients' Level of Satisfaction with the electronic health records system at the 37 Military Hospital

This section presents results of the association between perceived usefulness, perceived ease of use and behavior control and patients' level of satisfaction with EHRs at the 37 Military Hospital. The results revealed a significant relationship between perceived ease

of use (t= 4.56, p=0.000) and patients' level of satisfaction (t=3.15, p=0.002) with the implementation of the EHRs at the 37 Military Hospital. However, there was no significant association between perceived usefulness (t=1.50, p=0.135) and behavior control (t=1.15, p=0.252). However, the results indicated that a unit increase in perceived usefulness of EHRs will increase patients' level of satisfaction by 0.10 units. In addition, a unit increase in perceived ease of use of EHRs will increase patients' level of satisfaction by 0.33 units. Additionally, an increase in behavior control of EHRs will increase patients' level of satisfaction by 0.09 units. The results of the association between perceived usefulness, perceived ease of use, behavioral control and patients' level of satisfaction with EHRs at the 37 Military Hospital are displayed in table 4.13 below.

Table 4.13: Regression analysis: Association between Perceived Ease of Use, Perceived Usefulness, Behavior Control and Patients' level of satisfaction with electronic health records system at the 37 Military Hospital

Level of Satisfaction	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Perceived Usefulness	.1092098	.0727831	1.50	0.135	-.0345029	.2529225
Perceived Ease of Use	.3369751	.0739625	4.56	0.000	.1909336	.4830165
Behavioral Control	.0954981	.0831111	1.15	0.252	-.0686077	.2596038
_cons	1.323765	.4206672	3.15	0.002	.493143	2.154387

Prob>F = 0.000, R-squared = 0.1667

4.11. Regression Analysis: Association between Perceived Usefulness, Perceived Ease of Use, Behavior Control and Quality of care with the implementation of EHRs at the 37 Military Hospital

This section presents results of the association between perceived usefulness, perceived ease of use, behavior control and quality of care with the implementation of EHRs at the

37 Military Hospital. The results revealed that there was no significant association between perceived usefulness (t=0.57, p=0.570), perceived ease of use (t= 0.48, p=0.629) and behaviour control (t=0.40, p=0.687) and quality of care (t=5.18, p=0.000) with the implementation of the EHRs at the 37 Military Hospital. However, the results indicated that, a unit increase in perceived usefulness of EHRs system will increase the quality of care by 0.05 units. In addition, a unit increase in perceived ease of use of EHRs will increase quality of care by 0.04 units. Additionally, an increase in behavioural control of EHRs will increase quality of care by 0.04 units. The results of the association between perceived usefulness, perceived ease of use, behavioural control and quality of care on with the implementation of the EHRs at the 37 Military Hospital are displayed in table 4.14 below.

Table 4.14: Regression Analysis: Association between Perceived Usefulness, Perceived Ease of Use, Behavior Control and Quality of Care with the implementation of EHRs at the 37 Military Hospital

Quality of Care	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Perceived Usefulness	.0536714	.0942153	0.57	0.570	-.13236	.2397028
Perceived Ease of Use	.0462906	.095742	0.48	0.629	-.1427554	.2353365
Behavioral Control	.0434496	.1075846	0.40	0.687	-.16898	.2558792
_cons	2.823309	.54454	5.18	0.000	1.748096	3.898522

Prob>F = 0.7959, R-squared = 0.0062.

4.12. Regression Analysis: Association between quality of health care and patients' satisfaction

This section presents results of the association between quality of care and patients' satisfaction. A unit increase in attention to patients' health needs will increase patients' satisfaction by 0.15 units. In addition, a unit increase in responsiveness of health providers to emergencies will increase patients' satisfaction by 0.01 units. Additionally, a unit increase in patient-provider communication will increase patients' satisfaction by 0.01 units. A unit increase in efficiency of health services rendered will increase patients' satisfaction by 0.36 units. A unit increase in timeliness of healthcare will increase patients' satisfaction by 0.42 units and a unit increase in general patients' care will increase patients' satisfaction by 0.42 units. The results of the connection between quality of care and patients' satisfaction are displayed in table 4.15 below.

Table 4.15: Regression Analysis: Association between quality of care and patients' satisfaction

Patients' satisfaction	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Attention to patients' health needs	.1527438	.1328936	1.15	0.259	-.1182944	.423782
Responsiveness of health providers to emergencies	.0134129	.1363289	0.10	0.922	-.2646318	.2914576
Patient – Provider Communication	.0129314	.1232141	0.10	0.917	-.2383655	.2642282
Efficiency of services rendered	.3640518	.141447	2.57	0.015	.0755687	.652535
Timeliness of healthcare	.4232304	.1322923	3.20	0.003	.1534185	.6930422
General patients' care	.4254752	.1727962	2.46	0.020	.0730551	.7778954
_cons	1.261147	.7661325	-1.65	0.110	-2.823684	.3013908

Prob>F = 0.000, R-squared = 0.6525.

4.13. Chapter Summary

This chapter provided the results of the data collected from the questionnaires designed for this study. The chapter presented the socio-demographic characteristics of health workers and patients involved in the study, the level of quality of care, relationship between socio-demographic characteristics of health workers and patients and quality of care, association between perceived ease of use, perceived usefulness and behavioral control and quality of care. This chapter also presented results on patients' level of satisfaction with the implementation of EHRs and the challenges faced by the health workers with the EHRs at the 37 Military Hospital. The next chapter, which is chapter five, covers the discussion of the results in line with existing literature.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.0. Introduction

This chapter examines the results of the study in alignment with existing literature. The discussion of the findings is presented in sections coherent with the objectives of the study, thus, level of quality of care, perceived ease of use, perceived usefulness, behavior control and patients' level of satisfaction with the implementation of the EHRs at the 37 Military Hospital. The chapter ends with a summary of where the key ideas have been summed up and a direction of what the next chapter presents.

5.1. Level of Quality of Care at the 37 Military Hospital

This section consists of analysis on the results of the level of quality of care in relation to current literature. The study indicated that the 37 Military Hospital was assessed by patients to be very good in respect of attention to patients' need (M=3.68, SD =0.525), responsiveness of health providers to emergencies (M=3.81, SD=0.651), efficiency of services rendered (M=3.86, SD=0.528) and overall level of quality of care (M=4.02, SD=0.683). These results aligned with a study which discovered that factors such as attitude of health professionals towards patients, speedy healthcare service delivery, effective communication, the presence of modern apparatus, hospital's capacity to render 24-hour health services and the hygiene of the hospital will influence patients' satisfaction with a health facility (Peprah, 2014). However, these results were dissimilar to a study carried out at the Greater Accra Regional Hospital which inferred that the availability of nurses, doctor's time spent with patients, communication and behavior of

health workers as well as excellence of healthcare support delivered by paramedical staff were some of the indicators of healthcare that patients valued (Akuamoah-Boateng, 2020).

In addition, the 37 Military Hospital was assessed by health workers to be good in terms of adequate staffing (M=2.94, SD=1.007), effective administrative structure to deliver quality of care (M=3.20, SD=0.919), serene hospital environment (M=3.34, SD=1.04), adequate medical equipment to provide quality of care (M=2.88, SD=1.02) and overall level of quality of care (M=3.36, SD=0.898). These results aligned with a study which argued that adequate medical equipment, materials, facilities and availability of support staff had a positive influence on the provision of good quality of care by health professionals (Barhem, Younies & Younis 2010).

Critical analysis of these results through the lens of the Donabedian (2005) model implies that the process and outcome as assessed by the patients at the hospital were recommendable. However, management may have to focus extensively on its structures in terms of facilities, staff and equipment to increase its level of quality of care among the health workers at the 37 Military Hospital.

5.2. Socio-demographic Characteristics and Quality of Care

This section covered analysis of how the results on the socio-demographic characteristics and quality of care relate to current literature. The study showed that gender (p=0.570), age (p=0.685), educational level (p=0.628), marital standing (p=0.888), religion

(p=0.659) and rank of health workers (p=0.361) were not associated with the level of quality of care at the 37 Military Hospital. However, the experiences of health workers (p=0.011) as a variable was significantly associated with quality of care. The experiences of healthcare workers, especially with electronic health records system, plays a crucial function in the delivery of quality of care (Vehko et al., 2019). Alander and Scandurra (2016) explains that health workers with an experience of EHRs are more knowledgeable of the functionalities of software to deliver effective patients' healthcare services which invariably affected clinical output and, ultimately, quality of care.

In addition, the study revealed that gender (p=0.632), age (p=0.595), educational level (p=0.577) and occupation (p=0.451) of patients were not significantly associated with quality of care. However, the frequency of patients' visit to the health facility (p=0.049) was significantly associated with quality of care. These results were in consonance with a study which inferred that patients' frequent visit to a health center was the most significant predictor of quality of care (Kabatooro, Ndobol & Namatovu, 2016). The frequency of patients' visit to a health facility will increase their familiarization with health workers and services rendered. This could improve upon the quality of communication between the patients and health providers, thereby, ensuring a high level of quality of care (Alander & Scabndurra, 2016).

5.3. Perceived Usefulness of the Electronic Health Records System and Quality of Care

This section outlines analysis of how the results on the perceived usefulness of the EHRs and quality of care relate to current literature. The study revealed that the perceived usefulness of the EHRs in terms of difficulty to perform with the system (p=0.000), improvement of job performance (p=0.000), addressing job-related needs (p=0.000), enhancement of job effectiveness (p=0.000), accomplishment of tasks (p=0.000), attending to patients quickly and effectively (p=0.000), saving time (p=0.000), providing greater control over work (p=0.000) and overall level of perceived usefulness of the electronic health records system (p=0.0016) were significantly associated with quality of care at the 37 Military Hospital. These results correspond with a study in United States which discovered that EHRs' usefulness was connected with significantly enhanced quality of care (Kern et al., 2013). Similarly, a study inferred that attaining meaningful use of EHRs yielded a significant percentage point rise in the quality of care in the USA (Lin et al., 2019). However, these results were dissimilar to a study which found no association or change in patient satisfaction scores when the electronic health records system was used during outpatient services instead of paper medical records system (Stewart et al., 2010).

Analyzing these results using the Technology Acceptance Model (Bagozzi, 1989) model, it can be deduced that the perceived usefulness of the electronic health records system will influence health workers' acceptance and intention to use the technology in healthcare delivery.

5.4. Perceived Ease of Use and Quality of Care

This section entails analysis of how the results on the perceived ease of use of the EHRs and quality of care relate to current literature. The study showed that the perceived ease of use of the EHRs in terms of less confusion with EHRs (p=0.002), less frustrating human interface (p=0.011), ease of use (p=0.000), less consultation with user manual (p=0.000), helpful guidance (p=0.000), flexibility (p=0.000), software crashes (p=0.000), ease of correction (p=0.003) and overall level of perceived ease of use (p=0.000) were significantly connected with quality of care at the 37 Military Hospital.

However, making errors frequently when using the electronic health records system (p=0.062) was not significantly associated with quality of care. These results sit with a study which informed that the perceived ease of use of the EHRs in health institutions will be certain if the health staff found the technology's human interface less frustrating; easy to access, understand and navigate with the inclusion of guidance in performing tasks and coded to avoid input of errors (Tubaishat, 2017). Ammenwerth (2019) concluded that the perceived merits associated with the implementation of the EHRs will be null and void unless the technology was user-friendly and easy to use at the point of healthcare delivery.

A critical analysis of these results using Technology Acceptance Model (Bagozzi, 1989) reveals that the use and utilization of the EHRs in health institutions depends on the extent to which health workers perceive that the technology will be effortless and easy to use.

5.5. Behavior Control of EHRs and Quality of Care

This section outlined analysis of how the results of the behavior control of the electronic health records system and quality of care relate to current literature. The study showed that the behavioral control of the electronic health records system in terms of accessibility to same information on EHRs (p=0.029), regulations and rules that guide control (p=0.000), accountability for the use or misuse of patients' medical information (p=0.000), prompt detection of unauthorized access to patient's medical information (p=0.000) and overall level of perceived ease of use (p=0.000) were significantly associated with quality of care at the 37 Military Hospital.

Kuse et al. (2017) stated that one of the essential factors to be considered with implementation of EHRs was patients' privacy and security, hence, the need for health institutions to develop policies, rules and regulations that will guide health personnel's behavioral control of EHRs in the process of healthcare delivery. Harman et al. (2012) concluded that behavioral control of the EHRs should begin with the tasks and responsibilities of health staff, the level of information they are entitled to and the reason for the retrieval of such information.

Analyzing these results using theory of planned behavior (Ajzen, 1991), it can be deduced that the attitude, subjective verdict of others (in this case, patients) and perceived behavioral control will determine health professionals' behavioral intentions to accept the electronic health records system in healthcare delivery.

5.6. Patients' level of satisfaction with the implementation of EHRs at the 37 Military Hospital

This section covered analysis of how the results on the patients' level of satisfaction with the implementation of EHRs at the 37 Military Hospital relate to current literature. The results of the study revealed that 92.1% of patients at the 37 Military Hospital confirmed that the implementation of EHRs reduced waiting time for services (M=4.32, SD=0.93), 52.6% concurred that they received more attention from health providers at the hospital after the implementation of the EHRs (M=3.29, SD=0.98), 87% of the patients indicated that their diagnosis and laboratory results were quickly processed and communicated to other departments after the implementation of EHRs (M=4.0, SD=0.87), 60.5% confirmed an improvement of health provider-patient relationship (M=3.63, SD=1.05). In addition, 84.2% of the patients indicated that they will frequently seek treatment at the hospital due to improvement in health services after the implementation of EHRs (M=3.89, SD=0.95) and 71% confirmed their overall level of satisfaction with the implementation of EHRs at the 37 Military Hospital (M=3.73, SD=0.86).

Interestingly, studies on patients' level of satisfaction with the electronic health records system varies significantly (Rose et al., 2016: Mysen et al., 2016). Mysen et al. (2016) observed neutrality of patients on the use of the EHRs in healthcare delivery. Rose et al. (2016) discovered that the use of EHRs increased patients' overall satisfaction due to their involvement with health providers. Wali et al. (2020) deduced that patients' satisfaction with EHRs was statistically significant with overall satisfaction. The dimension of patients' satisfaction with the implementation of the electronic health

records system included reduced waiting time, efficient prescription dispensing, improved physician-patient relationship and increase in physician's attention during consultation.

In addition, 54.7% of the health workers at the 37 Military Hospital were neutral as to whether the implementation of EHRs reduced patients' waiting time (M=2.77, SD=0.99), 52.9% were neutral as to whether the implementation of EHRs facilitated patients' involvement with the health providers at the hospital (M=3.11, 0.94) and 43.7% were neutral as to whether the implementation of EHRs facilitated communication with patients (M=3.11, SD=0.98). In addition, 52.9% of the health workers viewed accessibility to laboratory and diagnostic test results to be very good (M=3.36, SD=1.19) and 36.9% indicated that overall patients' level of satisfaction with the implementation of EHRs at the 37 Military Hospital was good (M=3.23, SD=0.98).

The results revealed a positive relationship between patients' level of satisfaction with EHRs as a dependent variable and perceived ease of use, perceived usefulness and behavior control as independent variables. This implies that a unit increase in perceived ease of use, perceived usefulness and behavior control of EHRs will increase patients' level of satisfaction with the implementation of the EHRs at the 37 Military Hospital. Relating the findings to the concept of patient satisfaction, Gregory et al. (2015) argued that patients considered satisfaction with their healthcare experiences as a sign of quality healthcare, dependent on favorable outcomes.

5.7. Challenges faced by health workers after the implementation of EHRs at the 37 Military Hospital

This section comprises analysis of how the results of the challenges faced by health workers after the implementation of EHRs at the 37 Military Hospital relate to current literature. The study showed that the listed challenges with the implementation of the EHRs at the 37 Military Hospital by health workers included: poor network (41%), lack of backup power to run EHR system during power outage (28.5%), difficulty in retrieving saved patients' medical records (9.5%), limited availability of electronic devices to run EHR system software (7.6%), difficulty in displaying patients' medical/laboratory reports (5.7%), difficulty in correcting saved patients' medical records (4.8%) and delay in the transmission of medical result across units (2.9%).

Additionally, 62.5% of the health workers indicated their overall level of challenges with the EHRs. These results were in line with a study which observed that some health professionals found the electronic health records system to require a lengthy time to document health data; lacked the ability to display laboratory results; complex, hence, difficult to use; increased risk of making errors; unreliable due to the risk of power failure and very expensive to be sustained (Alanazi et al., 2020). Akanbi et al. (2012) concluded that the obstacles to the acceptance of the EHRs included poor network structure, high cost of procurement and maintenance and lack of comfort among health staff with the implementation of the system. Linking the findings to the theory of planned behavior, health workers' difficulty with electronic health records system will affect their behavior intention of fully utilizing the system to deliver quality of care.

5.8. Factors (Perceived Ease of Use, Perceived Usefulness, Behavior Control) associated with the implementation of EHRs and Patients' Level of Satisfaction at the 37 Military Hospital

This section focused on analysis of how the results of the factors (perceived ease of use, perceived usefulness, behavior control on patients' level of satisfaction) associated with the implementation of EHRs and patients' level of satisfaction at the 37 Military Hospital relate to current literature. The study revealed a significant relationship between perceived ease of use ($p=0.000$) and patients' level of satisfaction ($p=0.002$) with the implementation of the EHRs at the 37 Military Hospital. Additionally, there was no significant association between perceived usefulness ($p>0.05$) and behavior control ($p>0.05$). However, the results demonstrated that a unit increase in perceived ease of use, perceived usefulness and behavior control of the EHRs will increase patients' level of satisfaction with the implementation of the EHRs at the 37 Military Hospital.

These results were in line with a study which established a positive relationship between patients' level of satisfaction and the application of the EHRs (Liu et al., 2012). Alanazi et al. (2020) concluded that patients had positive perceptions and enhanced level of satisfaction with the use of the EHRs due to its perceived merits in delivering quality health services.

5.9. Factors (Perceived Usefulness, Perceived Ease of Use, Behaviour Control) associated with the implementation of EHRs and Quality of Care at the 37 Military Hospital

This section showed analysis of how the results of the factors (perceived usefulness, perceived ease of use, behavior control on quality of care) associated with the implementation of EHRs and quality of care at the 37 Military Hospital relate to current literature. The results indicate that there is no significant association between perceived usefulness (p=0.570), perceived ease of use (p=0.629) and behavioral control (p=0.687) and quality of care (p=0.000) with the application of the EHRs at the 37 Military Hospital. However, the results indicate that a unit increase in perceived ease of use, perceived usefulness and behavioral control of EHRs will increase quality of care with the operationalization of the EHRs at the 37 Military Hospital. These results are identical to a study in Saudi Arabia Hospital which discovered a positive correlation between perceived ease of use and perceived usefulness of the EHRs and the quality of patients' care (Aldosari & Alanzi, 2018). Obviously, these findings relate to the concept of quality of care which outlines that quality of care symbolizes processes of care which patients need and perceive as effective (Campbell et al. 2000).

5.10. Relationship between Quality of Care and Patients' Satisfaction

This section presents analysis of the findings of the relationship between quality of care and patients' satisfaction in accordance with current literature. The results indicate that a unit increase in attention to patients' health needs, responsiveness of health providers to emergencies, patient-provider communication, efficiency of health services rendered,

timeliness of healthcare and general patients' care will increase patients' satisfaction. These results agreed with a study which established a strong positive association between patients' level of satisfaction and healthcare provision indicators (Xesfingi & Vozikis, 2016). Umoke et al. (2020) inferred that patients were satisfied with tangibility, reliability, responsiveness, assurance and empathy. However, these findings were unrelated to a study which deduced that hospital size, surgical volume, availability of hospital beds and low mortality are significantly associated with patients' overall level of satisfaction (Kennedy, Tevis & Kent, 2015). However, the connection between patients' satisfaction and quality of care was established by Bonyo (2019) who opined that quality of care in health institutions could be linked with patients' satisfaction as patients' satisfaction depended largely on favorable health outcomes.

5.11. Chapter Summary

This chapter unveiled the findings of the study in accordance with existing literature. The chapter discussed findings relating to level of quality of care; individual factors (socio-demographic characteristics) and quality of care; perceived usefulness, perceived ease of use and behavior control of the electronic health records system and quality of care. The chapter also discussed patients' level of satisfaction with the operationalization of the EHRs and challenges faced by health workers with its implementation. The next chapter, which is chapter six, covers the summary, conclusions and recommendations drawn from the study.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.0. Introduction

This chapter outlines the summary, conclusions and recommendations drawn from this study which sought to assess the influence of the implementation of the electronic health records system on quality of care at the 37 Military Hospital. There are also sections on contribution to knowledge, restrictions to the study and future research.

6.1. Summary of the study

This section encompasses the summary of the study. The 37 Military Hospital adopted the electronic health records system in 2018 as part of its Health Information Management System (HMIS) to provide quality healthcare services to its growing patients and achieve its objective of going paperless. Therefore, the objective of the study was to assess the influence of the implementation of EHRs on quality of care at the 37 Military Hospital in Ghana. This study adopted a positivist philosophical approach with a case study design to collect data through the use of questionnaires from three hundred and forty-one (341) health workers and two hundred and forty-eight (248) patients; giving a total sample size of five hundred and eighty-nine (589) respondents for the study. The data collected was analyzed with the aid of Stata version 14.0.

The study indicated that the 37 Military Hospital was assessed by patients to be very good in respect of attention to patients' needs, responsiveness of health providers to emergencies, efficiency of services rendered and overall quality of care. In addition, the

hospital was assessed by health workers to be good in terms of adequate staffing, effective administrative structure to deliver quality of care, serene hospital environment, adequate medical equipment to provide quality of care and overall level of quality of care. Also, the results indicated that a unit increase in attention to patients' health needs, responsiveness of health providers to emergencies, patient-provider communication, efficiency of health services rendered, timeliness of healthcare and general patients' care will increase patients' satisfaction at the 37 Military Hospital.

6.2. Conclusions of the study

This part focuses on the inferences of the study in relation to the precise objectives. The study aimed to achieve its general objective by addressing the following precise objectives: determining the level of quality of care among the health providers at the 37 Military Hospital; examining the association between individual (socio-demographic characteristics) elements and quality of care, assessing the association among perceived usefulness of EHRs and quality of care; examining the association between perceived ease of use of EHRs and quality of care and determining health workers' and patients' level of satisfaction with the application of EHRs at the 37 Military Hospital. The key conclusions related to these have been presented below.

Level of Quality of Care among both patients and health providers

The study indicated the patients assessed the 37 Military Hospital to be very good in relation to attention to patients' needs (M=3.68, SD=0.525), responsiveness to emergencies (M=3.81, SD=0.651), efficiency of health services rendered (M=3.86,

SD=0.528) and overall level of quality of care (M=4.02, SD=0.683). These results aligned with a study which discovered that factors such as attitude of health professionals towards patients, speedy health services delivery, capacity to communicate, presence of modern medical gadgets, the hospital's capability to run 24-hour services and neatness of the hospital influenced patients' satisfaction with a health facility (Peprah, 2014).

Additionally, health workers assessed the 37 Military Hospital to be good in terms of adequate staffing (M=2.94, SD=1.007), effective administrative structure to deliver quality of care (M=3.20, SD=0.919), serene hospital environment (M=3.34, SD=1.04), adequate medical equipment to provide quality of care (M=2.88, SD=1.02) and overall level of quality of care (M=3.36, SD=0.898). These results aligned with a study which inferred that adequate medical equipment, materials, facilities and availability of support staff had a positive influence on the provision of good quality of care by health professionals (Barhem et al., 2010). Based on the low scoring on these dimensions of quality of care, it is apparent that the hospital needs to focus on ensuring the availability of adequate human resources, infrastructures and logistics to deliver quality of care.

Individual (socio-demographic characteristics) factors and quality of care

The study demonstrated that gender, educational level, religion, marital status and rank of health workers were not associated with the level of quality of care ($p>0.05$). Rather, the experience of health workers was considerably associated with quality of care ($p<0.05$). Apparently, health workers with an experience of EHR system were more knowledgeable of the functionalities of the software to deliver effective healthcare services which

invariably affected clinical productivity and, ultimately, quality of care (Alander & Scandurra, 2016). Therefore, the study indicated that health workers with an experience of operating EHR system will positively influence the delivery of quality of care.

Additionally, the study revealed that gender, age, educational level and occupation of patients were not associated with quality of care ($p>0.05$). Rather, the frequency of patients' visit to the health facility was meaningfully associated with quality of care ($p<0.05$). These findings confirmed a study which inferred that the frequency of patients' visit to a health facility will increase their familiarization with health workers and services rendered which could enhance communication depth between the patients and health providers, thereby, ensuring a high level of quality of care (Alander & Scabndurra, 2016).

Experience of health workers has been identified as the individual factor that will influence the delivery of quality of care while frequency of visit by patients to a health facility was established as the individual factor that will influence quality of care. These discoveries will be very essential in the drive by health institutions to ensure the delivery of quality care to the citizens of Ghana.

Perceived Usefulness of EHRs and Quality of Care

The study demonstrated that the perceived usefulness of the EHRs in terms of difficulty to perform with the system ($p<0.05$), improvement in job performance ($p<0.05$), addressing job-related needs ($p<0.05$), enhancement of job effectiveness ($p<0.05$),

accomplishment of tasks ($p<0.05$), attending to patients quickly and effectively ($p<0.05$), providing greater control over work ($p<0.05$) and overall level of perceived usefulness were meaningfully associated with quality of care ($p<0.05$). These results corroborate a study in the United States which discovered that EHRs' usefulness correlated with significantly enhanced quality of care (Kern et al., 2013). With these results, it was apparent that the implementation of the EHRs coupled with its perceived usefulness will facilitate the delivery of quality of care in health institutions.

Perceived Ease of Use of EHR system and Quality of Care

The study indicated that the perceived ease of use of the EHRs in terms of less confusion with EHRs ($p<0.05$), less frustrating human interface ($p<0.05$), ease of use ($p<0.05$), less consultation with user manual ($p<0.05$), helpful guidance ($p<0.05$), flexibility ($p<0.05$), software crashes ($p<0.05$), ease of correction ($p<0.05$) and overall level of perceived ease of use ($p<0.05$) were significantly associated with quality of care. However, making errors frequently when using EHRs was not associated with quality of care ($p>0.05$). These results support a study which argued that the perceived ease of use of EHRs in health institutions will be certain if the health staff found the technology's human interface less frustrating; easy to access, understand and navigate with the inclusion of guidance in performing tasks and coded to avoid input of errors (Tubaishat, 2017). The apparent ease of use of the EHRs is very crucial because of its ability to influence productivity at the point of healthcare delivery. Therefore, the electronic health records system should be designed to ensure ease of use by health workers.

Behaviour Control of EHRs and Quality of Care

The study indicated that behavioural control in terms of accessibility to same information on EHRs ($p<0.05$), regulation and rules that guide control ($p<0.05$), accountability for use or misuse of patients' medical information ($p<0.05$), prompt detection of unauthorized access to patients' medical information ($p<0.05$) and overall level of observed ease of use ($p<0.05$) were significantly associated with quality of care at the 37 Military Hospital. Kuse et al. (2017) enlightened that one of the essential factors to be considered with implementation of EHRs was patients' privacy and security. Hence, there is the need for health institutions to develop policies, rules and regulations that will guide health personnel's behavioral control of EHRs in the process of healthcare delivery. Privacy and confidentiality are very important in healthcare delivery, therefore, health institutions must ensure maximum protection of patients' medical records, especially with EHRs.

Health workers' and Patients' level of satisfaction with the implementation of EHR system

This study demonstrated that patients confirmed the implementation of EHRs reduced waiting time for services (92.1%), improved health provider–patient relationship (60.5%) and enabled their diagnosis and laboratory results to be processed quickly and communicated to other departments (87%). In addition, 84.2% of the patients indicated that they will frequently seek treatment at the hospital due to improvement in health services and 71% of the patients confirmed their overall level of satisfaction with the operationalization of the EHRs at the 37 Military Hospital. These results resonate with a

study which inferred that patients' overall satisfaction with EHR system was statistically significant with its implementation including: reduced waiting time, efficient prescription dispensing, improved physician-patient relationship and an increase in physicians' attention during consultation (Wali et al., 2020).

Additionally, health workers were unsure whether the implementation of EHRs reduced patients' waiting time (54.7%) or facilitated their involvement (52.9%) and communication with health providers (43.7%). However, 36.9% of the health workers indicated that the overall patients' level of satisfaction with the operationalization of the EHRs at the 37 Military Hospital was very good. Considering the positive relationship between patients' level of satisfaction with EHRs and perceived usefulness, perceived ease of use and behavioral control, a unit increase in perceived usefulness will increase patients' level by 0.10 units, a unit increase in perceived ease of use will increase patients' level by 0.33 units and a unit increase in behavioral control of EHRs will increase patients' level of satisfaction by 0.09 units. Accordingly, health institutions which have implemented the electronic health records system should ensure its smooth operation so as to maximize patients' level of satisfaction with healthcare services.

Challenges faced by health workers after the implementation of EHRs at the 37 Military Hospital

The study demonstrated a positive level of satisfaction from patients and health workers after the implementation of the EHRs. However, the EHRs at the hospital faced several challenges such as network, durability of electricity to ensure smooth running of the

system, retrieval of patients' records and procurement of electronic devices to run the system. These results aligned with a study which inferred that some health professionals found the electronic health records system to require a lengthy time to document health data; lacked the ability to display laboratory results; complex, hence, difficult to use; increased risk of making errors; unreliable due to the risk of power failure and very costly (Alanazi et al., 2020). Therefore, the study argued that the EHRs should be fully sustained and absolute remedies needed to be put in place to eradicate the challenges faced by health workers with its use so as to maximize the hospital's delivery of quality care.

6.3. Contribution to knowledge

Below, this unit focuses on the analysis of the contribution of this study to existing knowledge under contribution to policy and practice, contribution to theory and contribution to methodology.

6.3.1. Contribution to policy and practice

The results of the research will contribute to the government's policy on eHealth. The government through the Ghana Health Service and Ministry of Health developed an eHealth framework in 2010 to systematically deploy structures to enhance the delivery of healthcare services (Ogoe, Asamani, Hochheiser & Douglas, 2018). One of the main strategic themes was to move towards electronic records and reporting system (Ogoe et al., 2018). The findings of the study will help reshape this policy with emphasis on the need to build a robust ICT infrastructure, develop strategies that guarantee the safety of

patients' medical data and ensure adequate human resources to drive the successful application and sustainability of the EHRs in health institutions to deliver quality of healthcare.

6.3.2. Contribution to theory

The Donabedian (2005) model was applied to assess the level of quality of care at the 37 Military Hospital in which the findings indicated that the process and outcome at the hospital were recommendable. However, the hospital needs to develop its structures in terms of facilities, staff and equipment to increase its level of quality of care.

The Technology Acceptance Model (TAM) was applied in a hospital setting in which a study discovered that nurses had positive inclination towards the merits and ease of use of the EHRs and, subsequently, accepted the technology (Tubaishat, 2017). This theory helped to explain the framework of this study that the behavior of health workers concerning the usage of the EHRs will be as a result of its efficacy and ease of usage in improving the delivery of quality of care. The theory of planned behavior (TPB) was applied in a study which inferred that the constructs of perceived behavioral control, attitudes towards EHRs technology and perceived social pressure regarding EHRs usage clearly explained physicians' intention to fully utilize EHRs in their duties (Seeman & Gibson, 2009). This theory helped to explain in this study that attitude, subjective verdict of others (in this case, patients) and perceived behavioral control will determine health professionals' behavioral intention to accept the electronic health records system in healthcare delivery.

6.3.3. Contribution to methodology

The choice of a quantitative research method informed the researcher to design questionnaires as a data collection tool so as to come out with the findings of this study. A similar study adopted the qualitative research method to achieve results on the effect of the EHRs on the delivery of healthcare services at University of Ghana Hospital (Hayford, 2019). However, the application of quantitative research method in the current study contributed to a situation where the findings of the method have the potential to be inferred to the population of interest due to emphasis on quantifiable observations that were subjected to statistical analysis (Gill & Johnson, 2010).

6.4. Recommendations of the study

This section covers the recommendations of the study. Drawing inferences from the findings of the study, the following recommendations are proposed for consideration by stakeholders and policy makers.

6.4.1. Ghana Health Service (GHS)/Ministry of Health (MOH)

The electronic health records system has been acknowledged to be essential to Ghana's drive towards eHealth (Achampong, 2012). Therefore, this study recommends that the Ministry of Health/Ghana Health Service should reshape its ICT policy and strategy for the health sector to ensure adequate ICT infrastructure and human resource to drive the implementation of EHRs in health institutions.

6.4.2. Management of 37 Military Hospital

The 37 Military Hospital management should consider an alternative network infrastructure and procurement of electronic devices for all units at the hospital to ensure smooth transmission of records across units. Moreover, the hospital should procure a backup power generator that guarantees uninterrupted supply of electricity even during power outage. This study further recommends a training program for health workers operating the EHRs to enhance their understanding and knowledge of the system. The management of the 37 Military Hospital should include training or information sessions for the patients to help them gain knowledge about the functionalities of the electronic health system in delivering quality of care.

6.4.3. Patients/communities

The results of the study confirmed patients' overall satisfaction with the operation of EHRs. The study recommends that patients and communities exercise patience while the hospital tries to improve on the electronic health records system to deliver quality healthcare services.

6.5. Limitations to the study

This section outlined the limitations to the study. This study adopted a quantitative research method which does not provide room for participants' interactions (Almeida, Faria & Queiros, 2017). Moreover, the generalization of the results to the entire health sector may be restricted due to limited overall sample size of 589, the use of one quasi

hospital and one municipality out of 261 local Metropolitan Municipal and District Assemblies (MMDAs) in Ghana.

6.6. Future Research

This section presents the direction for future research based on the limitations to the study. This study used both health workers and patients at the 37 Military Hospital. Hence, future researchers could focus on increasing the sample size to cover a large range of participants. Moreover, future researchers could focus on adding other MMDAs and both public and private hospitals which have implemented the EHRs to examine the impact on quality of care. Future researchers could also focus on using qualitative research method to find explanations to the quantitative findings.

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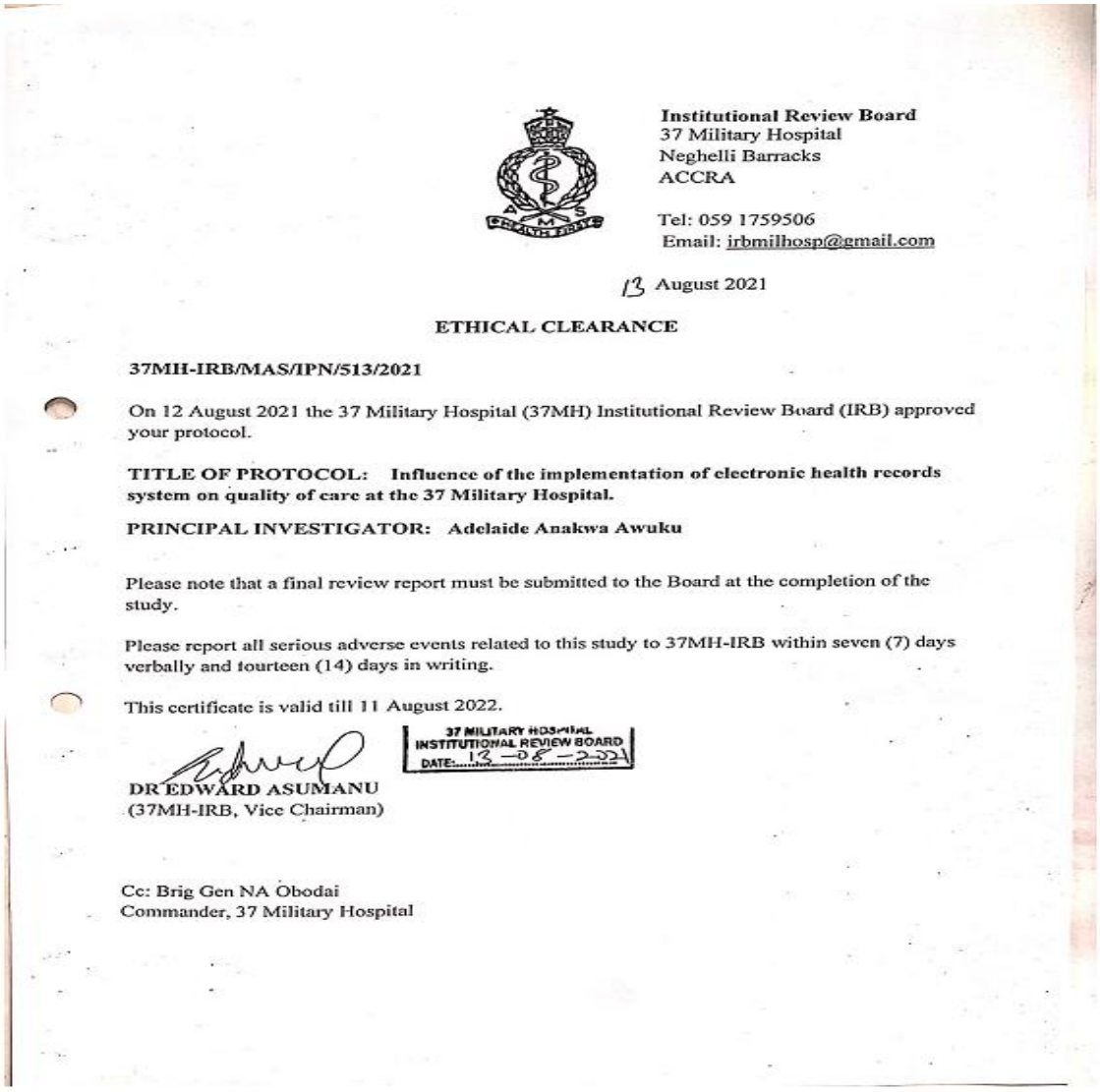
APPENDICES

University of Ghana

College of Health Sciences

School of Public Health

APPENDIX A: ETHICAL CLEARANCE



Institutional Review Board
37 Military Hospital
Neghelli Barracks
ACCRA

Tel: 059 1759506
Email: irbmilhosp@gmail.com

13 August 2021

ETHICAL CLEARANCE

37MH-IRB/MAS/IPN/513/2021

On 12 August 2021 the 37 Military Hospital (37MH) Institutional Review Board (IRB) approved your protocol.

TITLE OF PROTOCOL: Influence of the implementation of electronic health records system on quality of care at the 37 Military Hospital.

PRINCIPAL INVESTIGATOR: Adelaide Anakwa Awuku

Please note that a final review report must be submitted to the Board at the completion of the study.

Please report all serious adverse events related to this study to 37MH-IRB within seven (7) days verbally and fourteen (14) days in writing.

This certificate is valid till 11 August 2022.

37 MILITARY HOSPITAL
INSTITUTIONAL REVIEW BOARD
DATE: 12-08-2021

DR EDWARD ASUMANU
(37MH-IRB, Vice Chairman)

Cc: Brig Gen NA Obodai
Commander, 37 Military Hospital

University of Ghana

College of Health Sciences

School of Public Health

Appendix B: Questionnaire on Health Workers' Assessment of influence of the implementation of electronic health records system on quality of care at the 37 Military Hospital

Instructions

You have been asked to participate in this study. Please note that by completing this questionnaire, you are voluntarily agreeing to participate in this research. You will remain anonymous and your data will be treated confidentially at all times. Please complete this questionnaire in full as objectively as possible. Mark the appropriate answer with a tick/cross or write in the space provided.

Section A: Individual (Socio-demographic characteristics) factors

Please indicate your answer with a tick (√)

1. Gender

◊ Male [ ]

◊ Female [ ]

2. Age

Please indicate your age category

◊ < 20 [ ]

◊ 20 – 40 [ ]

◊ 41 – 60 [ ]

◊ 60 and above [ ]

3. Highest educational level?

◊ Diploma [ ]

◊ Degree [ ]

◊ Masters [ ]

◊ Doctorate [ ]

◊ Other (Specify) …….....

4. Marital Status

◊ Single [ ]

◊ Married [ ]

◊ Divorced [ ]

5. Religion

◊ Christianity [ ]

◊ Islamic [ ]

◊ Traditional [ ]

◊ Other (specify) ……

6. Rank……...

7. Staff Category ……..

Use of electronic health records system

8. Experience of using electronic health records system in delivering healthcare services?

◊ Less than a year [ ]

◊ 1 year [ ]

◊ 2 years [ ]

◊ 3 years [ ]

◊ More than 3 years [ ]

9. Which task do you use electronic health records system for?

◊ Update/creation of patients' file records [ ]

◊ Diagnosis [ ]

◊ Laboratory test results [ ]

◊ Prescription [ ]

◊ Other (specify) ……

10. Have you encountered any challenges with the electronic health records system?

◊ Yes [ ]

◊ No [ ]

If yes, kindly list the challenges or proceed to Section.

◊ ……

◊ ……

◊ ……

Section B: Level of Quality of Care

11. How will you assess the hospital on the following?

Scale: 1 - Weak, 2 - Fair, 3 – Neutral, 4 – Very Good, 5 - Excellent

	1	2	3	4	5
Adequate staffing					
Effective administrative structure to deliver quality of care					
Serene hospital environment					
Adequate medical equipment to provide quality of care					

Section C: Perceived usefulness of electronic health records system (EHRs) and quality of care

Kindly indicate the extent to which you agree or disagree with the statements presented below:

12. Perceived usefulness of electronic health records system (EHRs) in delivering quality of care

Statement	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
My job would be difficult to perform without EHRs					
Using EHRs system improves my job performance					
The EHRs system addresses my job related needs					
Using EHRs system enhances my effectiveness on the job					
Using EHRs system helps me to accomplish tasks more					

quickly					
Using EHRs system improves the quality of work I do					
Using EHRs system helps me to attend to patients more quickly and effectively					
Using EHRs system saves me time					
Using EHRs system gives me greater control over my work					
Overall, I find EHRs system very useful in delivering quality of health care					

Section D: Perceived ease of use of the electronic health records system (EHRs) and quality of care

13. Perceived ease of use of the electronic health records system (EHRs) in delivering quality of care

Statement	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
I often become confused when I use EHRs system					
I make errors frequently when I use the EHRs system					
The human interface of EHRs system is often frustrating					
I find it easy to get the EHRs system to do what I want it to do					
I need to consult the user manual often when I am using EHRs system					
The EHRs system provides helpful guidance in performing tasks					
The EHRs system is too rigid and inflexible to interact with					
The EHRs system often experiences software crashes					

I find it easy to correct my errors with the EHRs system					
Overall, I find the EHRs system easy to use					

Section E: Behaviour control of electronic health records system (EHRs) and quality of care

14. Behaviour control of electronic health records system and quality of care

Statement	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
All healthcare workers have access to the same information on EHRs system					
There are regulations and rules that guide my control of EHRs system in the hospital					
I am accountable for the use or misuse of a patient's medical information					
Unauthorised access to a patients' medical information can be detected promptly					
Overall, health personnel's behavioural control of EHRs system in the hospital is creditable.					

Section F: Patients' level of satisfaction with implementation of electronic health records system

15. Patient's level of satisfaction with the implementation of electronic health records system

.How will you assess patients' level of satisfaction with the implementation of electronic health records system?

Scale: 1 - Weak, 2 - Fair, 3 – Neutral, 4 – Very Good, 5 - Excellent

	1	2	3	4	5
Patients' waiting time					
Involvement with health provider					
Accessibility to laboratory and diagnostic test results					
Communication with patient					
Overall patients' level of satisfaction with EHRs system					

University of Ghana

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School of Public Health

Appendix C: Questionnaire on Patients' level of satisfaction with implementation of electronic health records system at the 37 Military Hospital

Instructions

You have been asked to participate in this study. Please note that by completing this questionnaire, you are voluntarily agreeing to participate in this research. You will remain anonymous and your data will be treated confidentially at all times. Please complete this questionnaire in full as objectively as possible. Mark the appropriate answer with a tick/cross or write in the space provided.

Please indicate your answer with a tick (√)

Section A: Individual (Socio-demographic characteristics) factors

1. Gender

◊ Male [ ]

◊ Female [ ]

2. Please indicate your age category

◊ < 20 [ ]

◊ 20 – 40 [ ]

◊ 41 – 60 [ ]

◊ 60 and above [ ]

3. Highest educational level?

◊ Senior High School

◊ Diploma [ ]

◊ Degree [ ]

◊ Masters [ ]

◊ Doctorate [ ]

Other (Specify) …….....

4. Occupation ……..

5. How long have you been a patient of this facility?

◊ Less than a year [ ]

◊ 1 – 4 years [ ]

◊ 5 – 9 years [ ]

◊ 10 years and above

Section B: Level of Quality of Care among health providers at the 37 Military Hospital

How will you assess the hospital on the following?

Scale: 1 - Weak, 2 - Fair, 3 – Neutral, 4 – Very Good, 5 - Excellent

	1	2	3	4	5
Attention to patients' health needs					
Responsiveness of health providers to emergencies					
Patient – Provider Communication					
Efficiency of services rendered					
Timeliness of healthcare					
General Patients' care at the hospital					
Overall level of quality of care					

Section C: Patients' level of satisfaction with the implementation of the electronic health records system at the 37 Military Hospital.

Kindly indicate the extent to which you agree or disagree with the statements presented below:

Statement	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
EHRs system has reduced the waiting time for services at the hospital					
I receive more attention from health providers at the hospital than ever before					
My diagnosis and laboratory test results are quickly processed and communicated to other departments at the hospital					
EHRs system has improved health provider – patient relationship at the hospital					
I am totally satisfied with the implementation of electronic health records system at the hospital					
I will always seek treatment at this hospital due to the improvement of services after the implementation of EHRs system					

Thank You!