World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

Check for updates

Electronic Health Records (EHRs) and quality healthcare delivery: qualitative study on selected hospitals in Ghana

Emmanuel Kwarteng-Amaniampong *

Department of Business Management & Entrepreneurship,, Faculty of Business and Management Sciences, Richfield Graduate Institute Technology, Cape Town – South Africa.

World Journal of Advanced Research and Reviews, 2025, 25(03), 393-405

Publication history: Received on 12 January 2025; revised on 01 March 2025; accepted on 04 March 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.25.3.0515

Abstract

Background: Ghanaian hospitals have been using paper health record systems with different cataloguing labels for decades. Hospitals all over the world now rely heavily on electronic health record (EHR) systems. Driven by e-health, Ghanaian hospitals are already using EHR systems to provide patients with high-quality care while adding value.

Purpose: This study attempts to investigate the adoption of EHR systems and how it affects the provision of high-quality healthcare services, drawing on the Technology Acceptance Model (TAM).

Methodology: Semi-structured interviews and qualitative research were employed as data collecting methods. Using the convenience sampling technique, an estimated 50 clinicians were chosen from four hospitals: Kumasi South, Manhyia, Suntreso Government, and Tafo Hospitals. Qualitative Research Software (QSR Nvivo v11) was used to code the transcripts.

Findings: The findings of the study demonstrated the importance of TAM model in adopting EHR systems, and how the adoption of EHR systems facilitate quality healthcare delivery. The study also underscores the importance of EHR systems in Ghanaian hospitals such as provision of information security, improved quality of care, enhanced patient safety, streamlined workflows and efficiency and improved communication and coordination of patients' care. However, the findings also found inadequate management support, inadequate training, the non-integration of other systems, and unfriendly user-interface as challenges of EHR systems.

Conclusion: The understanding and addressing the practical implications of TAM variables—perceived usefulness, ease of use, attitude towards use, behavioural intention to use and actual technology use – alongside variables that were revealed in this study – management support, adequate training, user-friendly interface and system quality—are crucial in determining the success of EHR systems adoption and its positive influence on quality healthcare delivery.

Keywords: Electronic Health Record; Healthcare; Technology Acceptance Model; Quality Healthcare Service Delivery; Clinicians

1. Introduction

Businesses, industries, institutions, society, and the economy have all been significantly impacted and changed by the technological revolution. This includes the rise and broad use of new technologies such as cloud computing, blockchain, and artificial intelligence, which have drastically impacted both the way people live and work as well as existing businesses and sectors. According to Esmaeilzadeh, Sambasivan, and Nezakati (2014), emerging technologies in

* Corresponding author: Emmanuel Kwarteng-Amaniampong

hospital settings show a lot of promise for improving the quality of healthcare delivery and making clinicians' jobs easier. One of the technologies that has revolutionised hospital operations and patient care is the Electronic Health Records (EHR) system. By providing a digital way to store, manage, and exchange patient data between departments within and between hospitals, EHR has completely changed the way healthcare is delivered.

EHR is a is a digital version of a patient's health record that was previously paper based records, and it encompasses a wide range of patient information, including medical history, medications, allergies, lab results, treatment plans, and among others (Adeniyi, Arowoogun, Chidi, Okolo & Babawarun, 2024; Attafuah, Abor, Abuosi, Nketiah-Amponsah & Tenza, 2022). EHR seeks to guarantee that timely access to accurate and comprehensive patient health information allows clinicians to make well-informed decisions, deliver effective care, and ultimately enhance patient outcomes (Li, Rao, Solares, Hassaine, Ramakrishnan, Canoy, Zhu, Rahimi, Salimi-Khorshidi, 2020; Enahoro, Ogugua, Anyanwu, Akomolafe, Odilibe & Daraojimba, 2024; Tanwar, Parekh, & Evans, 2020; Agyemang, Adu-Gyamfi, Esia-Donkoh & Acheampong, 2023). EHR system implementation provides information interoperability and health system integration, allowing various electronic health record systems to communicate and analyse patient data to make well-informed decisions regarding patients' health (Li, Clarke, Neves, Ashrafian & Darzi, 2021).

The provision of healthcare in Ghana is extremely difficult because there are more hospitals and other healthcare facilities in the larger cities and towns than in the smaller towns and villages. As the population grows, so does the demand for healthcare services, and residents of small towns and villages turn to various medical facilities in big cities for treatment. Clinicians' desire to see patients past medical records to understand medical history, treatment options, patient safety, continuity of care, and diagnostic efficacy presents a challenge. As a result, Ghana adopted the e-health project EHR, which sought to create a 24-hour information centre that would house the functions of disease surveillance and health information management (Achampong, 2022), information interoperability (Li et al., 2021), providing hospitals with current and correct information, lowering medical errors, and enabling improved clinician care coordination (Ajavon & Srivaramangai, 2023). According to research by Agyemang et al. (2023), Botchwey, Opoku, and Acquah (2021), and Dovia, Todoko, Nyagblornu, and Dzokoto (2024), Ghana's adoption of an EHR system has improved productivity, patient data collection, departmental sharing of patient information, care continuity, hospital-to-hospital information exchange, decision-making, and care coordination and organisation. Similar findings were reached by Kissi, Annobil, Tijani, and Kissi (2023) and Abotsi, Agbemafle, and Ayimey (2024), who found that EHR systems have increased the accuracy of patient records, made it easier to treat multiple patients at once, sped up appointment scheduling, and decreased the amount of time spent on care while maintaining high user satisfaction.

Woldemariam and Jimma (2023) pointed out that the majority of EHR systems are not well implemented, despite the advantages they offer. According to another study, the use of EHR in healthcare is linked to issues like low-quality records, frontline clinicians' lack of involvement in the system's development, clinicians' lack of training, poor system quality, and a shortage of workstations. These issues can result in medical accidents (Motsi, 2024). Research conducted by Mensah, Boadu, Adzakpah, Lasim, Amuakwa, Taylor-Abdulai and Chatio (2022), Abotsi et al. (2024), and Woldemariam and Jimma (2023) also showed that inadequate training, lack of managerial support, unreliable Internet and network connectivity, logistics, and inadequate technology all contributed to clinicians' negative attitudes towards using EHR systems. This illustrates the complexity of the EHR system's deployment and use, since it incorporates several elements to raise the standard of medical care in Ghanaian hospitals. Based on the Technology Acceptance Model (TAM), this study examined how the implementation of an EHR system more than a decade ago affected the provision of high-quality healthcare in Ghana by focussing on the experiences of clinicians in four government hospitals. The TAM's capacity to forecast successful technology uptake and explain user behaviour makes it a pertinent model for this investigation. The study also intends to identify the factors that encourage clinicians to utilise EHR systems and offer several implications to management, the government, and clinicians through the use of qualitative research methods and semi-structured interviews.

2. Theoretical foundation

The TAM model was adopted as a theoretical foundation of this study to provide an explanation of the determinants of the general acceptance of computers capable of describing user behaviour across a broader range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified (Davis, Bagozzi & Warshaw, 1989; Sadough, Khodaveisi & Ahmadi, 2018). This model provides a theoretical framework for understanding and forecasting how people embrace and utilise technology. Perceived usefulness, perceived ease of use, attitude towards use, behavioural intention to use, subjective norms, image, and facilitating conditions are the TAM variables that explain how a user's attitude towards a system affects their perception of its usefulness and ease of use. This attitude in turn influences the user's behavioural intention to use the system, which in turn influences the actual usage of the system (Davis et al. 1989; Bothma & Mostert, 2023; Davis, 1993; Kim, 2024; Mugo,

Njagi, Chemwei & Motanya, 2017; Marikyan & Papagiannidis, 2023). System features, the implementation process's nature, user participation design, and user training are examples of external variables that are covered (Venkatesh & Davis 1996).

Various scholars have offered their opinions on the factors that affect how beneficial and simple technology is to use in the context of EHR. According to Al-Otaibi, Tolma, Alali, Alhuwail, and Aljunid (2022), for instance, TAM was found to be useful in explaining variations in the patterns of technology use in EHRs. Evidence of significant relationships between perceived usefulness and perceived ease of use on clinicians' acceptance of attitudes as well as attitudes and intentions to use EHR systems was found by Sar, Mediawati and Yudianto (2024) and Alfuqaha, Rabay'ah, Al.khashashneh and Alsalaht (2022).

Research on TAM-HER has revealed several obstacles despite extensive TAM applications, including barriers to technological literacy, concerns about the digital divide, privacy and security issues, resistance to change, lack of awareness and information, health conditions and cognitive impairment, reliability and trust issues, a lack of customised interventions, overcoming age stereotypes, and integration with traditional healthcare (Kim, 2024). The delivery of high-quality healthcare services has also not improved because of clinicians in different hospitals accepting the validation of TAM and EHR systems. This is because staff members are frustrated by inadequate training, unreliable network and Internet connectivity, and a lack of managerial support (Mensah et al., 2022; Attafuah et al., 2022; Abotsi et al., 2024; Woldemariam & Jimma, 2023). Research has shown that to enhance the quality of healthcare provided in hospitals, several TAM factors should be integrated with EHR systems (Kim, 2024; Sadough et al., 2018; Mugo et al., 2017; Marikyan & Papagiannidis, 2023). This study investigated how the EHR systems implemented by a few chosen institutions can affect the provision of high-quality healthcare in Ghana by using qualitative data from TAM factors.

3. Research methodology

Semi-structured interviews were used in this study to examine the impact of EHR adoption on the provision of high-quality healthcare in a selected Ghanaian hospital. The relevant authorities granted permission. Over the course of six months, participant recruiting, interview questions, and data collection were completed. Four government hospitals in Kumasi—Kumasi South, Manhyia, Suntreso Government, and Tafo Hospitals—were used to choose the participants. Due to their adoption of EHR systems, and continuous use of EHR systems during the previous 24 months, the participants were chosen. Doctors (18), nurses (14), chemists (8), medical receptionists (4), and medical records clerks (6) comprised the sample size of 50 clinicians. The interviews were recorded on audio and then transcribed using Zoom, Microsoft Teams, and WhatsApp calls. Prior to thematic analysis, the transcripts were coded using Qualitative Research Software (QSR Nvivo v11) to identify trends and summarised the main ideas. The same questions were used to interview and recruit 15 volunteers to validate their responses and themes, and the same themes were discovered. Following the theme analysis, five more individuals were interviewed. The study confirmed that data from 15 participants can achieve theme saturation (Guest, Namey. & Chen, 2020; Sebele-Mpofu, 2020; Rahimi & Khatooni, 2024; Naeem, Ozuem, Howell & Ranfagni, 2024).

To find new trends and patterns, the transcriptions and discussion were also carried out separately. Major domain, themes, and patterns were identified in an iterative method. After going over 1025 quotes and phrases, codes were created in the participants' own words. When a participant responded, for instance, that "the EHR system has enhanced turn-around-time at our hospital," two codes were provided: EHR and enhanced time. Thus, 17 domains and 74 codes were created.

4. Results

This study aimed to explore the adoption of EHR systems and how they have impacted positively on quality healthcare delivery. Based on this, participants were interviewed on how the adopted EHR systems have improved quality healthcare services where the questions were based on TAM variables identified namely, perceived ease of use, perceived usefulness, attitude toward use, behavioural intention to use, and actual technology use.

4.1. TAM: perceived usefulness

The degree to which a person feels that utilising technology would improve their performance at work or help them accomplish a goal more quickly and successfully is known as perceived usefulness (Mugo et al., 2017; Marikyan & Papagiannidis, 2023). The perceived usefulness of EHR systems plays a crucial role in influencing clinicians' willingness to embrace and successfully use the technology. Hospitals and healthcare facilities have greatly benefited from the EHR systems' ability to streamline processes, cut down on paperwork, and minimise errors. Clinicians expressed this

forcefully. However, clinicians contended that the EHR system is confusing or hard to use, which leads to a negative opinion of its value. Clinicians also brought up issues with EHR systems since they need a lot of data entry or manual documentation, which takes time and often results in patients being left unattended. Clinicians characterised the system as helpful in managing patient records despite its many shortcomings.

4.2. TAM: perceived ease of use

The ease of use of a system plays a significant role in determining whether it will be widely adopted and utilised by organization, as it directly influences user satisfaction, system effectiveness, and overall service quality (Mugo et al., 2017; Sadough et al., 2018). One of the most important factors influencing clinicians' acceptance and uptake of technology in the context of EHR systems is perceived ease of use. Clinicians are more likely to use EHR systems regularly when they find them simple to use and straightforward to learn. Furthermore, a simple, uncomplicated interface with functions that are easy to use lowers frustration and increases the system's attractiveness. Because of its straightforward, intuitive, consistent, and easy-to-navigate architecture, which reduces doctors' cognitive load, the majority of clinicians stated that the EHR system's user interface is crucial in promoting perceived ease of use. In a similar vein, EHR systems greatly improve perceived ease of use by streamlining data entry procedures and utilising automated technologies to minimise typing or clicking. On the other hand, clinicians claimed that the system's intricate user interfaces deterred their interest by requiring them to choose from a wide range of options to complete their tasks. Clinicians also mentioned that when EHR systems don't fit well with current clinical workflows, they can be disruptive and difficult to use. Overall, it was suggested that to affect clinicians' perceptions of ease of use, EHR systems need to be simple and straightforward to use.

4.3. TAM: attitude toward use

According to the TAM, users' attitude of a system—like EHRs—have a significant impact on whether or not they are prepared to embrace and stick with it. Fostering a positive attitude among clinicians towards EHR systems can increase adoption rates, facilitate more efficient implementation, and enhance the provision of high-quality healthcare. The participants expressed gratitude for the ways the EHR has enhanced and decreased their burden. However, practitioners' attitudes towards EHRs are adversely affected by a lack of social and organisational factors, including peer opinions, management support, and institutional environments. It was discovered that earlier experiences with EHRs, workplace culture, managerial support, and individual preferences all contribute to the positive views that practitioners develop**.**

Conversely, clinicians stated that the EHR systems are typically not in line with their current clinical procedures and workflows. As a result, they believe the systems are irrelevant to their jobs, which discourages them from cultivating a positive attitude. As a result, management support is required. To improve attitudes to the usage of EHRs, they must also be in line with the current workflow. However, emotional and psychological factors that can affect attitudes towards EHR systems, like stress, anxiety, and job satisfaction, are not adequately covered by TAM.

4.4. TAM: behavioural intention to use

One of the key concepts of the TAM is behavioural intention to use. In the future, it signifies a person's desire or readiness to use a specific technology (Bothma & Mostert, 2023; Amin, Almari, Isaac & Mohammed, 2019). The willingness or intent of clinicians to embrace, interact with, and use the EHR system as part of their regular clinical practice is referred to as a behavioural intention to use in the context of EHR systems. Clinicians' perceptions of the EHR's value help to improve the provision of high-quality healthcare. This suggests that clinicians are more inclined to utilise EHRs voluntarily and regularly when they believe they will improve their work efficiency, increase the accuracy and accessibility of patient records, and make their jobs easier. Clinicians, for instance, reported that they changed their conduct from manual to EHR when they observed that EHR consistently and effectively reduced their burden. Clinicians reported that they are more likely to use EHR systems because of the user-friendly interface. Nevertheless, clinicians contend that thorough training is necessary because the system is more intricate and challenging to use, which has reduced their behavioural intention because of expected dissatisfaction. According to TAM, clinicians' behavioural intention to use EHRs will be favourable when they view them to be helpful and simple to use. However, the TAM model ignores supporting variables like training, technical assistance, management support, system quality, and resource availability, which also have an impact on clinicians' real behavioural intention adequately address psychological and emotional factors that can affect attitudes towards EHR systems, such as stress, anxiety, or work satisfaction.

4.5. TAM: actual technology use

The actual technology use is the ultimate outcome influenced by behavioural intention, perceived usefulness, and perceived ease of use. This was supported by the TAM that when clinicians have a strong intention to use EHR—driven

by perceived usefulness, ease of use, behavioural intention, and positive attitudes—they are more likely to use the system regularly. Clinicians also revealed that continuous support from management in all aspects, adequate training and quality of the systems assist us to feel confident and equipped to engage with EHR. When clinicians have a behavioural intention or been supported and motivated to use EHR systems translate directly to it actual use. For example, when clinicians are committed to using the system and believe it supports their roles effectively, they are more likely to continue using it over time.

However, frequent system downtimes, lack of internet connectivity issues on data accuracy, and usability issues by EHR systems inhibit users from consistent and willingness use, commented by clinicians. Further comment indicates that in most cases the EHR systems are not integrated with other technologies such as lab results and imaging systems which make them switch between different systems to get the work completed. This has created a barrier from using the EHR systems. This indicates that management support is paramount for system use by making sure that there is 24-hour continuous monitory of EHR systems to offer constant internet connectivity, regular updates, and integrate with other systems to offer ease of work to improved patient care coordination, more accurate data tracking, and streamlined workflows.

Now the main themes developed from the interview are presented and discussed.

4.5.1. Adequate training

Although proper training is essential for the successful use of EHR systems, clinicians indicated that they only got training prior to their initial use of the systems, which they believe is insufficient. According to reports, some clinicians have no training at all and focus on their previous experience, while others receive instruction for just one or two days. Others also received on-the-job training, while others received training via Zoom, MS Teams, and the phone. Among the problems discovered are the following:

"We have received a day training for the past three years and never receive any training even when the systems get undated…training must be continuous basis especially, when there is an update of the system software"

"We received a two-day training on the system when we were first introduced to the system and have also been receiving a yearly training though system software keeps on updating"

This suggests that receiving sufficient training makes it easier for clinicians to view the EHR systems as beneficial and simple to use. However, EHR training is either non-existent or insufficient for clinicians.

4.5.2. Management support

Participants noted that a key factor in the effective deployment and usage of EHR systems is support from peers, managers, supervisors, and the workplace environment. They said that no action has been taken even though every employee in the hospital is aware of it. It was recommended that management pay attention to their complaints to encourage and help them in using EHR systems more easily and delivering higher-quality healthcare.

"Management support to EHR systems is minimal and inadequate and this is causing us to feel emotional and psychological unprepared and sometime causing us to resist the use of the system"

Although, there is lack of managerial backing breeds disapproval of the usage of EHR systems. For EHR systems to be successfully adopted and implemented, management support is essential. For instance, when management actively supports and engages in EHR activities, creating a supportive environment and motivating clinicians to adopt a more positive attitude and behavioural intention towards the EHR systems. They offer the tools and cultural support required to promote clinicians' involvement and guarantee efficient system operation.

4.5.3. Improvement in the security of documents

EHR systems improve document security in a number of ways that shield privacy of patient data and stop illegal access. Participants disclosed that encryption is used by EHR systems to safeguard patient data while it is being stored in the system and when it is being moved between systems. This guarantees that without the right decryption key, data will remain unreadable even if it is intercepted or viewed without permission. Clinicians discovered this. Additionally, it was discovered that the EHR systems use stringent access restrictions to guarantee that patient data is only accessible by authorised individuals. Clinicians must therefore use secure login credentials to validate people before they can access

patient information. Multi-factor authentication (MFA) is typically used by EHR systems to further verify users' login credentials.

"The systems offer automatic log-off features and session timeouts features especially, where the user leaves his workstation unattended forgetting logging-off"

In hectic healthcare settings where professionals may leave workstations unattended for brief periods of time, this functionality is especially helpful. Compared to traditional paper-based records, which are susceptible to physical theft, loss, and damage, the incorporation of these capabilities into EHR systems has improved patient document security.

"The EHR systems contain secure data backups to protect against data loss from system failures, natural disasters, or cyberattacks".

Patient data is protected and recoverable thanks to these backups, which are safely kept and accessible when required. In addition to facilitating speedy data recovery in the case of system malfunctions or breaches, digital security procedures in EHRs also serve to guarantee the continuity and integrity of patient data.

4.5.4. Improvement in the safety of patients

Patient safety is the top priority in hospitals. By improving the precision, usability, and organisation of patient health data, EHR systems have greatly increased patient safety in the medical field. Because EHR systems can identify possible prescription interactions, allergies, and dose errors, hence preventing adverse drug events, clinicians reported that having accurate patient data had decreased medication errors. By lowering errors caused by unreadable handwriting and fragmented paper records and swiftly granting access to a patient's medical history, lab results, and previous treatments, it will be possible to increase data accessibility and accuracy and make better decisions that will increase patient safety. Disclosed by the participants.

Additionally, participants mentioned that EHR systems enable more effective monitoring of infection outbreaks and patient isolation status when data is easily accessible. Better infection control procedures are facilitated by this easy access to infection history and data, especially in hospital settings. Others noted that in the absence of EHR systems, preserving patient safety is mostly relied on manual procedures, which are prone to inefficiency and human mistake. It was further suggested that EHR systems facilitate preventive screenings and follow-up reminders, which are less dependable with paper-based methods. Therefore, in the absence of these reminders, patients can neglect to schedule follow-up appointments, screenings, or immunisations, which could lead to the progression of avoidable illnesses.

"The EHR systems enable us to provide seamless information sharing with other healthcare centres, facilitating coordinated care across various departments and facilities to improve patients' safety"

"The systems provide emails, text messages and WhatsApp messages to doctors and patients to inform them what they should do next. For example, when patients must take their medication and review them,

The enhanced care coordination between healthcare centres reduces the risk of duplicate tests and ensures all centres have access to up-to-date patient information, which is particularly valuable in emergency care to improve patient safety.

4.5.5. Provision of a user-friendly interface

To support perceived usefulness and ease of use in hospitals, the majority of EHR systems—if not all of them—implemented in different hospitals have user-friendly interfaces. Clinicians' comments. It was discovered that by making key features easier to access and understand, user-friendly EHR system interfaces increase productivity, accuracy, and overall quality of treatment. EHR interfaces are generally distinguished by their easy navigation and well-organised sections for prescriptions, test results, patient histories, and other crucial areas. Clinicians can obtain patient information more rapidly and effectively because of the user-friendly interfaces, which cut down on the amount of time they spend looking for information.

"*Our EHR allows for customization based on our roles, meaning that we doctor, nurses, pharmacists and administrative staff can each view a version of the interface tailored to their specific needs"*

This approach ensures that users only see the information and functions relevant to them, reducing cognitive overload and enhancing workflow. It was revealed that the EHR systems often incorporate decision support tools directly into

the user interface, providing clinicians with reminders, alerts, and evidence-based recommendations. Therefore, by incorporating intuitive layouts, role-specific customization, decision support, and mobile accessibility, EHR systems create a user-friendly experience that is aligned with the fast-paced, data-intensive needs of hospitals. This design focus supports clinicians in delivering high-quality, efficient care, ultimately improving patient outcomes and clinicians' satisfaction.

4.5.6. Improvement in the quality healthcare services

Implementing an EHR system has improved the delivery of high-quality healthcare services in several ways, including interactions across hospitals and departments as well as between clinicians and patients. These gains range from improved patient outcomes to streamlined workflows. By guaranteeing more accurate patient information and lowering transcription errors that are frequent with paper records, participants said that EHR systems improved accuracy and decreased errors. Additionally, it was suggested that EHR systems lower the possibility of misunderstandings, especially when it comes to important information like drug lists and allergies. The adoption of EHR systems, according to the participants, has made it possible for them to standardise data entry and store thorough medical records, lowering the possibility of misunderstandings. This is especially true for important information like medication lists and allergies, which can help prevent adverse medication events and improve patient safety to provide higher-quality healthcare.

"We believe EHR systems are essential for modern healthcare as they improve patient safety by ensuring data accuracy, support clinical decision-making with embedded tools, and engage patients in their own care".

"EHRs provide alerts and reminders for preventive care and screenings, helping healthcare providers adhere to best practices and guidelines".

To improve the quality of healthcare, EHR system facilitate faster and more accurate access to patient data, increase communication between departments, hospitals, and clinicians, and improve decision-making through information-driven insights.

5. Discussion and implications

Clinicians felt that the adoption of EHR systems has generally impacted the provision of high-quality healthcare in Ghana, and the deployment of these systems in different hospitals was facilitated by TAM as a factor in the system's widespread acceptance. Based on clinicians' individual experiences, the current study, which is based on the TAM, investigates the impact of EHR system adoption on the provision of high-quality healthcare. Perceived usefulness, perceived ease of use, behavioural intention usage, attitude towards use, and actual technology use were the five TAM factors that served as the basis for the interview (Davis et al., 1989; Mugo et al., 2017; Marikyan & Papagiannidis, 2023). According to the analysis, the study adds to the body of literature by showing that TAM supports both adoption and the limitations of EHR systems. The findings, therefore, have been aligned with previous studies. A modified TAM is presented in Figure 1.

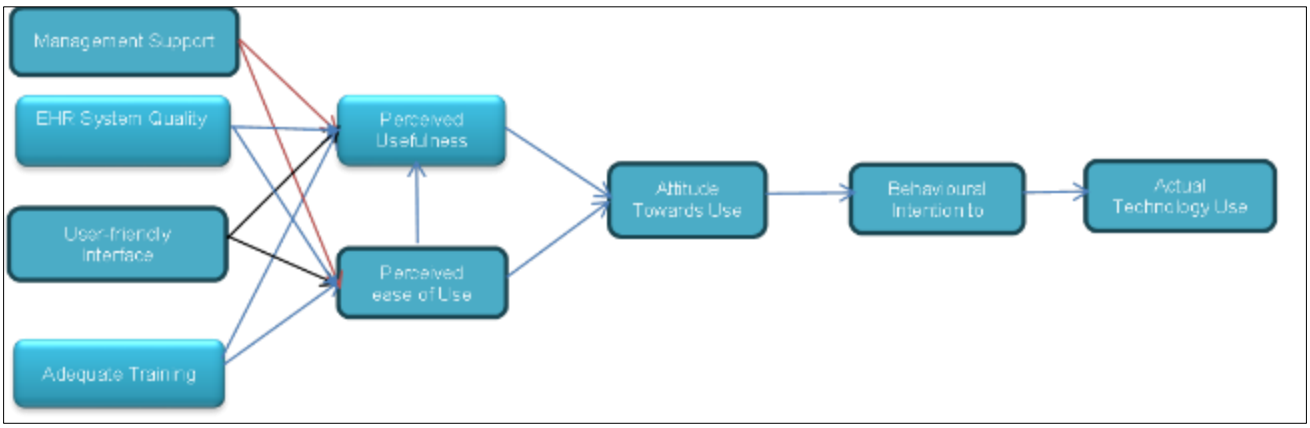

Figure 1 Modified TAM

According to the findings, clinicians' perceived usefulness of EHR influences their willingness to use the systems as they rationalize workflow and eliminate or reduce errors in patients' information. The perceived usefulness of EHR systems is reinforced when clinicians see direct benefits in document security. This interplay enhances the TAM model's effectiveness in explaining EHR adoption. For instance, clinicians might initially be concerned about the security of digital patient records. However, as they observe EHR systems preventing unauthorized access, securely storing data, and providing audit logs, they become more confident in the technology's reliability. This growing trust boosts their perception of EHR systems as useful tools, positively impacting their intention to use them regularly. The findings of the study support study by Silow-Carroll, Edwards and Rodin (2012) and Tusch, Higbea, VanderKooi, Warkoczeski, Sankey, and Cole (2019) that EHR systems facilitate patient safety with checklists, alerts, and predictive tools than traditional paper record. The findings also confirm studies by Tanner, Gans, White, Nath and Pohl (2015), Li, Clarke, Ashrafian, Darzi and Neves (2022), Enahoro et al. (2024) and Sharma and Prabha (2018) that EHR systems offer a significant higher rate of workflows, policies and practices that promote patient safety and privacy than paper record systems.

The findings also revealed that when clinicians perceived the ease of use of EHR systems, in terms of easy to navigate, a straightforward and non-cumbersome interface with user-friendly features make the system more appealing for use. The study found a relationship between perceived ease of use, EHR systems and system interface. For instance, it was revealed that when clinicians see the EHR systems are user-friendly, then it influences their perceived ease of use which implies that it motivates them to fully engage in using the system. In other words, it was found that when an EHR system has an intuitive interface, it naturally feels easier to use, which positively impacts users' attitudes toward adopting and regularly using it. The findings of the study support Naemi, Akbarian, Ebrahimi, Shahmoradi, Masoomian and Rezay (2024) that the EHR systems with easy and user-friendly interface influence perceived ease of use to improve patients and clinicians' interactions to improve quality healthcare. It was also found that most clinicians lack adequate training and system quality have influenced clinicians to cultivate negative perception of ease of use of EHR. The findings support studies that inadequate training has frustrated clinicians to develop negative attitudes towards the use of the EHR system (Mensah et al., 2022; Abotsi et al., 2024) and this has created challenges to quality healthcare delivery. However, prior studies by Upadhyay and Hu (2022), Lee, Kim and Lee (2015) and Campione and Liu (2024) found that EHR system training can boost user acceptance of EHR systems, system quality and utilization, and system satisfaction.

Positive attitudes, boosted by perceived benefits, training, support, and systems quality enhance the likelihood of EHR adoption among hospitals. However, the study found that inadequate EHR training and workplace culture are creating negative attitude towards EHR systems. Additionally, it was revealed that clinicians lack support from management, negative comments from peers and other clinicians and non-integration of existing workflows may deter clinicians from cultivation of positive attitude to use. Hence, the findings reject Secginil, Erdagan and Monsen (2013) that clinicians cultivate positive attitude towards EHR systems use. Likewise, the findings refuted Alrasheeday, Alshammari, Alkubati, Pasay-an, Albloushi and Alshammari (2023) that clinicians particularly, nurses cultivate positive attitude towards the adoption of HER systems in various hospitals.

The study also reported an interaction between "behavioural intention to use" and EHR systems adoption as the central to understanding how EHR systems become integrated within healthcare settings. Clinicians who acknowledge the value of EHR system in improving and protecting patient data accuracy may develop a strong behavioural intention to use them, which translates to higher actual usage rates. Behavioural intention not only influences the initial adoption but also impacts long-term usage patterns. Sustainable management support influences clinicians' positive behavioural intention to use EHR systems are more likely to adopt new updates and engage in advanced functionalities within the system, fostering deeper integration of EHRs into healthcare operations. The findings support Alsyouf and Ishak (2018) and Alsyouf, Ishak, Lutfi, Alhazmi, and Al-Okaily (2022) that rigorous support and attention from top management to clinicians could improve their continuation of behavioural intention to use EHR systems. Similarly, the findings confirm Faida, Wahyuni, Sutha and Elisanti's (2023) study that behavioural intention to use EHR systems through management support and influence. Likewise, an individual's motivation or willingness to employ effort to perform the target behaviour by Ammenwerth (2019).

The study found that clinicians will have a strong intention to use EHR systems—driven by perceived usefulness, ease of use, behavioural intention, and positive attitudes—they are more likely to use the system regularly, confirming Alsyouf, Lutfi, Alsubahi, Alhazmi, Al-Mugheed, Anshasi, Alharbi and Albugami (2023). The findings show that the actual use of the EHR results in smoother data entry, faster retrieval of patient information, and better coordination of care among clinicians, departments, between other hospitals and system quality. The actively used EHR systems have seen major improvements in the quality healthcare through better access to patient data, streamlined workflows, and more efficient care coordination. The findings validate Silow-Carroll et al. (2012) and Motsi (2024) studies that the EHR systems implementation has improved efficiency and effectiveness of healthcare delivery by providing clinicians with access to timely and accurate patient information, enabling them to make more informed decisions about patient care.

The findings also align with Adeniyi, Arowoogun, Chidi, Okolo and Babawarun (2024) that EHR systems have influenced information quality, reduced medical error, diagnosis and treatment of diseases and improvement of patient's healthcare.

However, the extent of these improvements depends significantly on the actual use of the EHR system and the degree to which it is integrated into clinical practice. Additionally, resource constraints, poor/insufficient training and management support for users, system quality and the non-integration of other systems were found to be the hindrance to actual use the EHR systems, supporting Tsai, Eghdam, Davoody, Wright, Flowerday and Koch's (2020), (Attafuah et al. (2022) and Mensah et al. (2022), studies that resource constraints, poor/inadequate training and management support, technical/educational support, bad system quality, poor literacy and skills in technology were the challenges that prevent clinicians from using the technology.

The practical implications of the study are discussed below:

Although there are still several issues that need to be resolved to increase the system's overall acceptance, the study has shown how important EHR systems are to hospitals. The success of EHR system adoption and its beneficial impact on high-quality healthcare delivery were determined by this study to be most dependent on factors such as perceived usefulness, ease of use, management support, adequate training, system quality, and user-friendly interface. Each of these factors affect how successfully hospitals and clinicians embrace, use, and profit from EHR systems, which in turn affects patient care, safety, and operational effectiveness.

For clinicians to perceive EHR systems as useful, they need to see a tangible benefit in improving the quality of healthcare. This includes facilitating evidence-based decision-making, facilitating quicker access to thorough patient data, and facilitating the retrieval of medical records. Clinicians are more inclined to embrace and make full use of EHR systems when they understand how they affect patient care. This improves diagnostic precision, treatment consistency, and the continuity of high-quality healthcare.

EHR systems are easier to use with a user-friendly interface, which lowers frustration and minimises mistakes. Clinicians are more likely to find an EHR interface useful and less complicated to use if it is easy to use and fits well with their workflows. This suggests that an EHR system that is simple to use can increase adoption rates, motivate clinicians to use it frequently, and result in better documentation, fewer data input errors, and quicker access to patient data, all of which can improve efficiency and the standard of patient care.

By securing resources, easing change management, and attending to doctors' concerns, effective management support encourages the use of EHRs. Hospital management's dedication to EHR integration demonstrates their appreciation of technology and willingness to make investments in its advancement. This implies that clinicians are more inclined to adopt EHRs when they believe that management encourages them to do so. By encouraging clinicians to use the EHR system efficiently, this fosters a culture of trust and accountability that improves patient outcomes and care coordination.

Users must receive thorough training in order to feel comfortable using the EHR system. Essential skills, troubleshooting, and best practices should all be covered in enough training that is customised for each user based on their specific position. Giving clinicians proper training lowers the learning curve, increases user competency, and lessens resistance to the adoption of EHRs since skilled clinicians are less likely to make mistakes, which results in better data integrity, more accurate documentation, and ultimately safer patient care which enhances patient outcomes and improves care coordination.

Users must receive thorough training to feel comfortable using the EHR system. Essential skills, troubleshooting, and best practices should all be covered with adequate training that is customised for each user based on their specific position. Giving clinicians proper training lowers the learning curve, increases user competency, and lessens resistance to the adoption of EHRs since skilled clinicians are less likely to make mistakes, which results in better data integrity, more accurate documentation, and ultimately safer patient care.

Maintaining document security in EHR systems is essential for safeguarding private patient data and adhering to data privacy laws. Unauthorised access and data breaches are prevented by security measures like encryption, secure login, and frequent audits. Therefore, to encourage clinician and patient trust in the EHR system, a strong document security feature must be provided. In order to uphold high standards of care and patient confidence, this improves patient confidentiality and guarantees the protection and security of sensitive health information.

According to the study, EHR systems can greatly increase patient safety by lowering prescription errors, avoiding redundant testing, sending out timely health risk alerts, and facilitating correct documentation which are essential for providing safe patient care. Therefore, EHRs immediately contribute to safer treatment decisions by reducing errors and guaranteeing prompt access to all patient information. As a result, patient safety is improved overall, adverse events are reduced, and chronic illnesses are better monitored.

6. Conclusion

The study, which was based on the TAM, sought to investigate the adoption of EHR systems and their impact on the provision of high-quality healthcare in Ghanaian institutions. According to the study, TAM has a big impact on clinicians' adoption of EHR systems, which affects the provision of high-quality healthcare. Thus, for successful EHR adoption and effective utilisation, it is essential to comprehend and address the practical implications of TAM variables—perceived usefulness, ease of use, attitude towards use, behavioural intention to use, and actual technology use—as well as variables that were identified in this study: management support, adequate training, user-friendly interface, and system quality. Every element is essential to encouraging consumer acceptability and contentment, which in turn leads to higher-quality healthcare. EHR systems are more likely to be effectively incorporated into practices by clinicians who view them as useful instruments that improve patient safety and healthcare delivery.is urged to look at how EHR systems are always changing to provide high-quality healthcare.

An atmosphere where EHR systems can be fully utilised is created by supportive management, adequate training, user-friendly interfaces, high-quality systems, and strong document security measures. These systems promote safer, better coordinated, and more effective care by reducing errors, making it easier to obtain accurate patient information, and enhancing the quality of documentation. In the end, clinicians and hospitals may optimise the influence of EHR systems on healthcare quality and the overall patient experience by matching TAM factor with hospital objectives. This will guarantee improved patient outcomes and more efficient workflows for clinicians.

Limitations and future research

Since the current study only looks at four hospitals in one location, it is advised that future research choose hospitals from various places around the nation. Since TAM1 was utilised in this study to evaluate hospital EHR adoptions, future research must concentrate on either TAM2 or 3. Robust quantitative empirical research must be used to explore in the same direction as this study because it was qualitative in nature. Lastly, because this study was cross-sectional in nature, a longitudinal study is recommended to examine how EHR systems are always changing in relation to the provision of high-quality healthcare

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflicts of interest regarding the publication of this study.

References

[1] Abotsi, B. W., Agbemafle, E. L. & Ayimey, E. P. (2024). Positive outcomes and challenges of electronic health record systems: A case of a Ghanaian hospital. Journal of Health Informatics Africa. 11(1), 10-21. DOI: 10.12856/JHIA-2024-v11-i1-457

[2] Achampong, E. K. (2022). Implementation of electronic health record system in Ghana: A Review. The Open Public Health Journal, 15, 1-5. DOI: 10.2174/18749445-v15-e2208181.

[3] Adeniyi, A. O., Arowoogun, J. O., Chidi, R., Okolo, C. A. & Babawarun, O. (2024). The impact of electronic health records on patient care and outcomes: A comprehensive review. World Journal of Advanced Research and Reviews, 21(02), 1446–1455. DOI: https://doi.org/10.30574/wjarr.2024.21.2.0592.

[4] Alsyouf, A. & Ishak, A. K. (2018). Understanding EHRs continuance intention to use from the perspectives of UTAUT: practice environment moderating effect and top management support as predictor variables. International Journal of Environmental Research and Public Health. 10(1/2), 24-59.

[5] Alfuqaha, O., Rabay'ah, M., Al-khashashneh, O. & Alsalaht, M. (2022). Technology acceptance model among nurses and other healthcare providers during the 2019 Coronavirus pandemic: a comparative cross-sectional study. Central European Journal of Nursing and Midwifery. 13(4), 775–782. DOI: 10.15452/CEJNM.2022.13.0023.

[6] Alrasheeday, A.M., Alshammari, B., Alkubati, S. A., Pasay-an, E., Albloushi, M., & Alshammari, A. M. (2023). Nurses' Attitudes and Factors Affecting Use of Electronic Health Record in Saudi Arabia. Healthcare. 11, 1-13. https://doi.org/10.3390/healthcare11172393

[7] Alsyouf, A., Ishak, A. K., Lutfi, A., Alhazmi, F. N. & Al-Okaily, M. (2022). The role of personality and top management support in continuance intention to use electronic health record systems among nurses. International Journal of Environmental Research and Public Health. 19, 1-31 https://doi.org/10.3390/ijerph191711125

[8] Alsyouf, A., Lutfi, A., Alsubahi, N., Alhazmi, F. N., Al-Mugheed, K., Anshasi, R. J., Alharbi, N. I. & Albugami, M. (2023). The Use of a technology acceptance model (TAM) to predict patients' usage of a personal health record system: The role of security, privacy, and usability. International Journal of Environmental Research and Public Health. 20, 1-24. https://doi.org/10.3390/ijerph20021347

[9] Agyemang, E., Adu-Gyamfi, A. B., Esia-Donkoh, K. & Acheampong, E. K. (2023). Effective use of electronic health records system for healthcare delivery in Ghana. Frontier Health Information, 12, 1-7. DOI: 10.30699/fhi.v12i0.510.

[10] Ajavon, A. & Srivaramangai, P. (2023). Electronic health record's, data security and access control in medical centers in Ghana. International Journal of Information Technology and Management Information Systems, 14(1): 21-32. DOI: https://doi.org/10.17605/OSF.IO/47STZ.

[11] Al-Otaibi, J., Tolma, E., Alali, W., Alhuwail, D. & Aljunid, S. M. (2022). The factors contributing to physicians' current use of and satisfaction with electronic health records in Kuwait's Public Health Care: Cross-sectional Questionnaire Study. Journal of Medical Information Records. 10(10), 1-20. DOI: 10.2196/36313

[12] Ammenwerth, E. (2019). Technology Acceptance Models in ealth nformatics: TAM and UTAUT. Applied Interdisciplinary Theory in Health Informatics. 64-71. DOI:10.3233/SHTI190111.

[13] Amin, A., Almari, H., Isaac, O. & Mohammed, F. (2019). Investigating the key factors influencing the use of online social networks in public sector context in the UAE. International Journal of Innovation 7(3), 392–411. https://doi.org/10.5585/iji.v7i3.347

[14] Attafuah, P. Y. A., Abor, P. A., Abuosi, A. A., Nketiah-Amponsah, E. & Tenza, I. S. (2022). Satisfied or not satisfied? Electronic health records system implementation in Ghana: Health leaders' perspective. BMC Medical Informatics and Decision Making, 22: 1-9. https://doi.org/10.1186/s12911-022-01998-0.

[15] Botchwey, C. O. A., Opoku, R. & Acquah, F. (2021). Exploring the impact of electronic health records systems on the performance of a healthcare organisation-a qualitative study in Ghana. Asian Journal of Research in Nursing and Health. 4(4), 251-257.

[16] Bothma, M. & Mostert, L. (2023). Adopting the technology acceptance model: A Namibian perspective. South African Journal of Information Management. 25(1), 1-10. https://doi.org/10.4102/sajim.v25i1.1624

[17] Campione, J. & Liu, H. (2024). Perceptions of hospital electronic health record (EHR) training, support, and patient safety by staff position and tenure. BMC Health Services Research. 24, 1-11. https://doi.org/10.1186/s12913-024-11322-3

[18] Davis, F. D., Bagozzi, R. P. & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. Management Science. 35(8), 982–1003. https://doi.org/10.1287/mnsc.35.8.982

[19] Dovia, C. K., Todoko, C. A., Nyagblornu, N. & Dzokoto, S. Y. (2024). Assessment on the use of electronic health records in healthcare facilities in the Ho Municipality of Ghana. European Journal of Science, Innovation and Technology, 4(1): 291-304.

[20] Enahoro, Q. E., Ogugua, J. O., Anyanwu, E. C., Akomolafe, O., Odilibe, I. P. & Daraojimba, A. T. (2024). The impact of electronic health records on healthcare delivery and patient outcomes: A review. World Journal of Advanced Research and Reviews, 21(02), 451–460. DOI: https://doi.org/10.30574/wjarr.2024.21.2.0478.

[21] Esmaeilzadeh, P., Sambasivan, M. & Nezakati, H. (2014). the limitations of using the existing TAM in adoption of clinical decision support systemin hospitals: An empirical study in Malaysia. International Journal of Research in Business and Social Science. 3(2), 56-68.

[22] Faida, E. W., Wahyuni, T., Sutha, D. W. & Elisanti, A. D. (2023). Role of work engagement in behavioural intention to use electronic medical records: A cross-sectional study. Pharmacy Education. 23(4), 92 – 98. https://doi.org/10.46542/pe.2023.234.9298

[23] Guest, G., Namey, E. & Chen, M. (2020). A simple method to assess and report thematic saturation in qualitative research. PLoS ONE. 15(5), e0232076. https://doi.org/10.1371/journal.pone.0232076

[24] Kim, S.D. (2024). Application and challenges of the technology acceptance model in elderlyhealthcare: Insights from ChatGPT. Technologies, 12(68), 1-19.https://doi.org/10.3390/technologies12050068.

[25] Kissi, J., Annobil, C., Tijani, A. & Kissi, A. A. (2023). Electronic Health Record Impact on Data Quality: An Integrated Review. Integrated Health Research Journal. 1(2), 77-85. https://doi.org/10.47963/ihrj.v1i2.1376.

[26] Lee, S. M., Kim, Y. R. & Lee, J. (2015). An empirical study of the relationships among end-user information systems acceptance, training, and effectiveness. Journal Management Information System. 12, 189-202. https://doi.org/10.1080/07421222.1995.11518086

[27] Li, Y., Rao, S., Solares, J. R. A., Hassaine, A., Ramakrishnan, R., Canoy, D. Zhu, Y., Rahimi, K. & Salimi-Khorshidi, G. (2020). BEHRT: Transformer for electronic health records. Scientific reports, 10(1), 1-12. DOI:10.1038/s41598-020-62922-y.

[28] Li, E., Clarke, J., Neves, A. L., Ashrafian, H. & Darzi, A. (2021). Electronic health records, interoperability and patient safety in health systems of high-income countries: A systematic review protocol. BMJ Open, 11, 1-5. Doi:10.1136/bmjopen-2020-044941

[29] Li, E., Clarke, J., Ashrafian, H., Darzi, A. & Neves, A. L. (2022). the impact of electronic health record interoperability on safety and quality of care in high-income countries: Systematic review. Journal of Medical Internet Research. 24(9), 1-15. DOI: 10.2196/38144.

[30] Marikyan, D. & Papagiannidis, S. (2023) Technology acceptance model: A review. In S. Papagiannidis (Ed), TheoryHub Book. Available at https://open.ncl.ac.uk / ISBN: 9781739604400

[31] Mensah, N. K., Boadu, R. O., Adzakpah, G., Lasim, O. U., Amuakwa, R. D., Taylor-Abdulai, H. B. & Chatio, S. T. (2022). Electronic health records post-implementation challenges in selected hospitals: A qualitative study in the Central Region of southern Ghana. Health Information Management Journal, 0(0): 1-8. DOI: 10.1177/18333583221096899.

[32] Motsi, L. (2024). Electronic health records model to improve the quality of patients' healthcare. Health SA Gesondheid - Journal of Interdisciplinary Health Sciences. 29(0), 1-23. https://doi.org/10.4102/hsag.v29i0.2414.

[33] Motsi, L. & Chimbo, B. (2024). Evidence-based healthcare practice adoption: The impact of electronic health records. Africa's Public Service Delivery & Performance Review. 12(1), 1-9. DOI: https://doi.org/10.4102/apsdpr.v12i1.728

[34] Mugo, D. G., Njagi, K., Chemwei, B. & Motanya, J. O. (2017). The technology acceptance model (TAM) and its application to the utilization of mobile learning technologies. British Journal of Mathematics & Computer Science. 20(4), 1-8. DOI: 10.9734/BJMCS/2017/29015.

[35] Naeem, M., Ozuem, W., Howell, K. & Ranfagni, S. (2024). Demystification and actualisation of data saturation in qualitative research through thematic analysis. International Journal of Qualitative Methods, 23, 1–17. DOI: 10.1177/16094069241229777.

[36] Naemi, R., Akbarian, M., Ebrahimi, M., Shahmoradi, L., Masoomian, B. & Rezay, S. (2024). Design and evaluation of a web-based electronic health record for amblyopia. Frontiers in Medicine. 11, 1-11. DOI: 10.3389/fmed.2024.1322821.

[37] National E-Health Project with Bio-surveillance (Early Warning) System - Ministry Of Health. [Online]. https://www.moh.gov.gh/national-e-health-project-with-bio-surveillance-early-warning-system/ [Accessed, September 13, 224].

[38] Rahimi, S. & Khatooni, M. (2024). Saturation in qualitative research: An evolutionary concept analysis. International Journal of Nursing Studies Advances. 6, 1-11. https://doi.org/10.1016/j.ijnsa.2024.100174. Sadough, F., Khodaveisi, T. & Ahmadi, H. (2018). The used theories for the adoption of electronic health record: A systematic literature review. Health and Technology, 1-18. https://doi.org/10.1007/s12553-018-0277-8

[39] Sar, N., Mediawati, A. S. & Yudianto, K. (2024). Use of the technology acceptance model for electronic medical records in nursing documentation: Scooping review. Indonesian Journal of Global Health Research. 6(4), 1953-1962. https://doi.org/10.37287/ijghr.v6i4.3373.

[40] Sebele-Mpofu, F. Y. (2020). Saturation controversy in qualitative research: Complexities and underlying assumptions. A literature review. Cogent Social Sciences, 6(1), 1-17. DOI: 10.1080/23311886.2020.1838706.

[41] Secginil, S., Erdagan, S. & Monsen, K. A. (2013). Attitudes of health professionals towards electronic health records in primary health care settings: A questionnaire survey. Informatics for Health and Social Care. 39(1), 1-18. DOI:10.3109/17538157.2013.834342

[42] Sharma, D. & Prabha, C. (2018). Security and privacy aspects of electronic health records: A review. International Conference on Advancement in Computation & Computer Technologie. 1-6. DOI:10.1109/InCACCT57535.2023.10141814.

[43] Silow-Carroll, S., Edwards, J. N. & Rodin, D. (2012). Using electronic health records to improve qualityand efficiency: The experiences of leading hospitals. The Commonwealth fund. 1-41.

[44] Tsai, C. H., Eghdam, A., Davoody, N., Wright, G., Flowerday, S. & Koch, S. (2020). Effects of electronic health record implementation and barriers to adoption and use: a scoping review and qualitative analysis of the content. Life. 10, 1-27. DOI:10.3390/life10120327

[45] Tanner, C., Gans, D., White, J., Nath, R. & Pohl, J. (2015). Electronic health records and patient safety: Co-occurrence of early EHR implementation with patient safety practices in primary care settings. Applied Clinical Informatics. 6, 136–147. http://dx.doi.org/10.4338/ACI-2014-11-RA-0099

[46] Tanwar, S., Parekh, K., & Evans, R. (2020). Blockchain-based electronic healthcare record system for healthcare 4.0 applications. Journal of Information Security and Applications, 50(10), 1-13. DOI:10.1016/j.jisa.2019.102407.

[47] Tusch, G. Higbea, R. J., VanderKooi, M., Warkoczeski, L., Sankey, W. & Cole, J. (2019). Impact of EHR usability on provider efficiency and patient safety in non-hospital settings. Transactions of the International Conference on Health Information Technology Advancement. 4(1), 121-126. https://scholarworks.wmich.edu/ichita_transactions/71

[48] Upadhyay, S. & Hu, H. F. (2022). A qualitative analysis of the impact of electronic health records (EHR) on healthcare quality and safety: Clinicians' lived experiences. Health Services Insights. 5, 1–7. DOI: 10.1177/11786329211070722.

[49] Woldemariam, M. T. & Jimma, W. (2023). Adoption of electronic health record systems to enhance the quality of healthcare in low-income countries: A systematic review. BMJ Health & Care Informatics. 30, 1-9. DOI:10.1136/bmjhci-2022-100704