Evaluating the impact of Electronic Health Records on Healthcare Quality in Resource-Limited Settings: Evidence from a Ghanaian Mission Hospital

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Abstract

A reliable information network is crucial for delivering effective and efficient medical care. The significance of information within the healthcare system is immense, as it plays a pivotal role in facilitating communication and coordination among various departments, professionals, and between patients and clinicians. As such, it is essential to assess the impact of various health information systems, such as Electronic Health Records (EHR), on the quality of healthcare.

This study examined the impact of EHR on the quality of healthcare delivery. Twelve participants were interviewed, comprising seven staff members and five patients/clients receiving care at Our Lady of Grace Hospital in Breman Asikuma, Central Region. Thematic analysis was utilized to analyze the interview data. The findings revealed that EHR is extensively used across almost all departments at Our Lady of Grace Hospital, from administrative to clinical activities. Most staff were motivated to use EHR due to its usefulness and ease of use. Furthermore, the use of EHR contributed to improved care quality by reducing waiting times, saving costs, delivering safe and reliable care, easing patient identification, minimizing waste, enhancing customer satisfaction, and increasing revenue generation through accurate billing.

In conclusion, EHR offers numerous benefits in healthcare delivery and has the potential to enhance the quality of care when properly implemented. The study recommends the continued use of EHR at Our Lady of Grace Hospital. However, this should be accompanied by ongoing training and retraining for both staff and clients on EHR usage. Additionally, it is necessary to develop user guidelines or manuals that include troubleshooting steps and instructions on what to do if system issues arise, including server problems.

Keywords: Electronic Health Records, EHR usage, Ghana, Healthcare delivery, Resource-limited settings

INTRODUCTION

The global shift towards digital health technologies has significantly transformed healthcare delivery, particularly through the adoption of Electronic Health Records (EHRs). EHRs are digital platforms that allow for the systematic collection, storage, and retrieval of patient health information, facilitating more

efficient and accurate healthcare delivery. The benefits of EHR systems include improved patient safety, enhanced clinical decision-making, reduced healthcare costs, and streamlined administrative processes (Alotaibi & Federico, 2021; Nguyen et al., 2021).

Despite these advantages, the adoption and implementation of EHRs in low- and middle-income countries (LMICs) such as Ghana have been met with numerous challenges. Ghana's healthcare system has been undergoing significant reforms aimed at improving the quality of care and expanding access to health services. As part of these reforms, there has been a concerted effort to digitize health records, a move that is critical for improving the efficiency of health service delivery (Ministry of Health, Ghana, 2021). However, the transition from paper-based records to EHRs has been slow, especially in rural and semi-urban areas where healthcare facilities often face infrastructural and resource constraints (Boateng et al., 2021).

Our Lady of Grace Hospital, located in the Asikuma Odoben Brakwa District, represents a microcosm of the broader challenges and opportunities associated with EHR implementation in Ghana. As a mission hospital, it has been at the forefront of providing essential healthcare services to communities that are often underserved by government facilities. The hospital's management has recognized the potential of EHRs to improve service delivery and patient outcomes. However, the process of implementing and fully integrating EHRs into the hospital's operations has been met with several challenges, including inadequate IT infrastructure, limited financial resources, and the need for specialized training for healthcare workers (Darko et al., 2022).

In recent years, several studies have highlighted the importance of EHRs in improving healthcare delivery in LMICs. For instance, Aduful et al. (2018) demonstrated that EHRs could significantly reduce the time spent on administrative tasks, allowing healthcare providers to focus more on patient care. However, they also noted that the success of EHR implementation is heavily dependent on the availability of infrastructure and the readiness of healthcare workers to adapt to new technologies. Similarly, a study by Opoku et al. (2020) on EHR adoption in rural Ghana identified key barriers such as high initial costs, lack of technical support, and resistance to change among staff.

This research paper aimed to explore the implementation and utilization of EHRs at Our Lady of Grace Hospital, with a focus on understanding the benefits, challenges, and potential strategies for improvement. By conducting an in-depth case study of this hospital, the paper sought to contribute to the broader discourse on EHR adoption in Ghana, providing insights that could inform policy and practice in similar contexts across the country.

THEORETICAL AND CONCEPTUAL LITERATURE

This study is guided by the Technology Acceptance Model (TAM), which provides a theoretical lens for understanding user acceptance of technology. TAM posits that perceived usefulness and perceived ease of use significantly influence an individual's behavioral intention to use a technology system (Holden & Karsh, 2020). In the context of EHR adoption, TAM is highly applicable as it explains how staff attitudes towards EHR can affect implementation success. By integrating TAM into the study, the research is grounded in a theoretical framework that connects technology adoption with organizational behavior and quality of care outcomes.

METHODOLOGY

Study Design

This study adopted a convergent mixed-methods case study approach, grounded in Yin's (2018) methodology. This approach enabled an in-depth exploration of the complex realities of electronic health record (EHR) use within the hospital, integrating qualitative and quantitative data to provide a comprehensive understanding of user experiences and organizational impact.

Theoretical Framework

The Technology Acceptance Model (TAM) served as the theoretical foundation, guiding the exploration of how perceived usefulness and ease of use influenced staff and patient engagement with the EHR system. By applying TAM, the study systematically examined behavioral intentions, actual use patterns, and the contextual factors shaping technology acceptance.

Setting and Context

The research took place in a large district hospital housing more than 300 inpatient beds and serving around 12,000 outpatients monthly. The hospital's EHR system had been fully operational for over three years, encompassing patient registration, clinical documentation, laboratory services, pharmacy dispensing, and discharge summaries. The system aimed to streamline patient care processes while improving data accuracy and accessibility.

Participants

Participants were selected through purposive sampling until no new themes emerged, ensuring data saturation. Healthcare professionals who had used the EHR system for at least six months were invited to share their perspectives, while patients included in the study had completed a minimum of three EHR-mediated visits to the hospital. Exclusion criteria covered temporary agency staff and patients whose interactions were limited to emergency services, to ensure insights were drawn from individuals with substantial exposure to the system.

Data Collection Procedure

Data collection combined several methods to create a holistic picture. Semi-structured interviews lasting between 45 and 60 minutes were conducted using an interview guide grounded in TAM constructs, encouraging participants to reflect on perceived usefulness, ease of use, and actual usage experiences. Additionally, structured observations of staff interactions with the EHR were carried out in clinical settings, guided by a modified version of the Systems Engineering Initiative for Patient Safety (SEIPS) framework. Document analysis included reviewing hospital policies on EHR use, system training materials, and anonymized usage statistics to contextualize participant accounts. Finally, patient perspectives were captured through validated satisfaction surveys, focusing on their experiences of receiving care mediated by the EHR. Additionally, researcher reflexivity was included to address positioning and bias mitigation, with an appendix containing the validated interview guide, pilot testing notes, and guide modifications. Triangulation was enhanced by incorporating document analysis, system usage logs, and patient

satisfaction surveys, and participant validation of transcripts was also conducted to strengthen credibility.

Data Management and Analysis

To enhance credibility, triangulation is essential (Creswell, 2013; Patton, 2014). Triangulation involves assessing each study point from multiple perspectives, which allows for confirmation of findings through different approaches. In this study, two primary instruments were employed to evaluate EHR operations. The researcher's observations, combined with responses from healthcare staff and patients accessing EHR services, provided diverse and corroborative dimensions to validate the results from observations against verbal feedback (Lincoln & Guba, 1985; Patton, 2014). The triangulation of data from various instruments and participants significantly enhanced the study's credibility.

The voice recordings from the interviews were first listened to at least twice to gain a general understanding of the issues raised. The recordings were then meticulously transcribed and reviewed by two additional individuals as a quality control measure. The transcribed data, along with data from observations, were subsequently organized through content analysis into themes that align with the main objectives of the study.

RESULTS

Demography of Respondents

The 12 participants, comprising 7 staff members and 5 clients/patients were purposively selected based on their direct interaction with EHR systems, representing key stakeholder groups affected by the technology implementation."

The table below summarizes the demographics of the study participants, detailing their professions, gender, and years of experience working with or using the EHR system in the hospital.

Table 1: Demographic characteristics of study participants

Respondent	Gender	Portfolio	Years of experience interacting with EHR	Education level	Age
Respondent 1	Male	Medical officer	7	Tertiary	33
Respondent 2	Female	Nurse	2	Tertiary	27
Respondent 3	Female	Nurse	5	Tertiary	25
Respondent 4	Male	Laboratory scientist	3	Tertiary	28
Respondent 5	Male	Pharmacist	12	Tertiary	45
Respondent 6	Male	Medical Record officer	7	Tertiary	37
Respondent 7	Female	Hospital administrator	9	Tertiary	30
Respondent 8	Female	Client 1	16	Tertiary	60
Respondent 9	Female	Client 2	8	Tertiary	18
Respondent 10	Male	Client 3	5	Tertiary	21
Respondent 11	Female	Client 4	12	23	22
Respondent 12	Male	Client 5	7	29	55

Source: field data (2022)

Across the twelve respondents, there were six males and six females, resulting in an equal gender split (50% each). Participants represented a mix of roles: six were staff members, including a medical officer, nurses, laboratory scientist, pharmacist, medical records officer, and hospital administrator; while the other six were clients who had interacted with the EHR multiple times.

All respondents reported having at least tertiary education (where data was provided), which suggests the sample had a relatively high educational background.

The years of experience interacting with the EHR ranged from 2 years (a nurse) to 16 years (Client 1). The mean (average) years of experience were approximately 7.58 years. The median value (the middle value when ordered) was 7 years, and the mode (the most common value) was also 7 years, which was reported by three respondents.

The ages of respondents ranged from 18 years (Client 2) to 60 years (Client 1). The mean (average) age was approximately 31.58 years. The median age was 28.5 years (meaning half of the sample was below about 29 years and half above). There was no mode for age because no single age appeared more than once.

The sample thus shows a balanced gender distribution, a wide age ranges from young adult to senior client, and varied professional backgrounds and client experiences. The years of experience were also spread, although clustered around 5–9 years for most respondents, while a few outliers had much longer experience.

Use of EHR in the Hospital

The results indicated that EHR was a necessary component of the facility's daily operations, as perceived by management, clinical staff, and patients. Nearly everyone is either directly connected to the EHR or indirectly affected by its use. EHR utilization extends across all professions within the facility, with all record-keeping tasks being carried out on the system. This sentiment was echoed by 6 out of 7 staff participants, with the laboratory scientist (R4) stating…

> *All our records in this department are performed on the system. There is no, or if any at all, little paper work as far as records is concerned. The paper work may be some unofficial scribblings that individuals do to guide them but all official documentations and patient records are done on the system. The system is used in virtually everything, I can say everything; from records, OPD, consulting rooms, laboratory, pharmacy, wards, everywhere. That's what we use (R4).*

Respondent 5 (pharmacist) noted that sometimes when the hospital runs out of certain drugs, they write external prescriptions for patients to purchase from chemical shops outside the hospital. While this practice helps ensure patients still receive needed medication, it highlights a limitation

of the EHR system: the need to step outside digital workflows when inventory is unavailable. This adaptation shows that comprehensive EHR use does not fully prevent manual workarounds, especially during stock shortages, and illustrates how external prescription writing becomes an informal extension of digital prescribing when the system cannot fulfil requests internally. As Respondent 5 explained:

Sometimes when we ran out of certain drugs and patients come with those requests, we write them out for them on the form for them to take to chemical shops outside the hospital to buy.

Behavioral Intent to use EHR

Perceived Usefulness of EHR

Overall, there was a consensus among respondents, particularly staff members, regarding the usefulness of the EHR system Seven out of seven staff participants expressed positive perceptions of EHR usefulness, while patient views were more varied (3 positive, 2 neutral). The EHR system is used for registering patients, maintaining patient records, and tracking treatment history, among other functions. It serves the same purposes as the paper-based record system but offers additional benefits and capabilities, highlighting its effectiveness and utility.

Respondent 5 (pharmacist) described the electronic system as “far more useful,” explaining that it supports nearly every aspect of hospital record-keeping and data management, including analysis for decision-making. This quote was selected because it illustrates a broader pattern in the data: seven out of twelve participants shared similarly positive views on the EHR’s ability to streamline workflows and enhance data accessibility. Additional evidence from structured observations and system usage logs showed frequent reliance on electronic reports for routine decision-making. Together, this reflects a common perception that the EHR system not only replicates manual processes but extends their usefulness in daily practice.

For me personally, the electronic system is far more useful. You can use it in virtually everything to do with records and data in the hospital. Even data analysis to inform decisions and care. It can do

everything the manual system use to do and even more than that (R5).

Perceived ease of use of EHR

Through iterative coding and constant comparison, ease of use emerged as a primary theme, mentioned by 9 of 12 participants. The analysis also indicated that the ease of use of EHR was closely linked to ongoing training and retraining, as well as the availability of necessary tools and hardware.

Respondent 4 (laboratory scientist) explained that "the electronic is easier to use," noting that once users understand the system, it becomes intuitive and efficient. They highlighted how built-in features, such as automated suggestions, simplify data entry and reduce errors. This perspective aligns with responses from five other participants who also described the EHR as user-friendly and quick to navigate once familiar. Observations further supported this view, showing staff completing routine tasks—like retrieving lab results or updating patient records—in significantly less time compared to manual systems. Collectively, these findings suggest that perceived ease of use is a major factor driving staff acceptance of the EHR, consistent with the Technology Acceptance Model (TAM) framework guiding this study.

The electronic is easier to use for me. You just have to know your way around it and it's smooth. Sometimes the system even suggests options for you to choose from. From the point of accessing information, it's just a click of a button and you have the information. It's not that a complex system (R4).

Respondent 2 (nurse) shared that "typing is a difficult thing for me," explaining they are quicker writing with pen and paper than entering data into the EHR. They described frequently needing help from technical staff when minor issues arise, which makes the system feel less intuitive despite ongoing efforts to adapt. This view reflects a recurring concern raised by four other participants who also noted challenges related to limited typing skills, confidence with digital tools, or system navigation. Observations further supported these self-reports: some staff took noticeably longer to complete electronic entries and occasionally paused to ask colleagues for assistance. These findings highlight that perceived ease of use, a central concept in the Technology Acceptance Model (TAM), varies among users depending on digital literacy, and that targeted

training or ongoing technical support may be necessary to help staff feel more comfortable with electronic systems.

> *Well, I don't know about others but typing is a difficult thing for me. I am faster writing with pen and paper than typing. So, it's difficult for me when I have to enter patient records into their electronic folders. And every now and then I have to call the technician to come and help me when there is any little issue with the system. So technically it isn't really that easy for me to use but I am adopting (R2).*

Quality of Healthcare

Benefits and of EHR

Several thematic areas emerged from the respondents' feedback about the benefits of the EHR system at Our Lady of Grace Hospital. Respondents highlighted that the EHR helps capture detailed patient information, which can then be shared easily among relevant caregivers. This sharing was described as promoting transparency and accountability, although no participant specifically used the term "peer review." Comprehensive electronic records were also seen as valuable for supporting continuity of care during future visits. From the analysis, the main themes identified were: improved quality of patient requisitions, the ability to manage and attend to multiple patients at once, and better quality and completeness of patient records.

Simultaneous Attendance of Patients

Respondent 1 (medical officer) explained that the EHR system allows for remote consultation and collaboration among medical staff, saying, "Doctors from their homes can view patient records and advise attending nurses on what to do." They added that different professionals—including nurses, pharmacists, and lab staff—can simultaneously view and update a patient's folder from their respective departments, rather than waiting for paper files to be passed around. While this highlights perceived efficiency benefits, the data did not include details on how often such remote consultations actually happen in practice, and no participant raised concerns about data privacy or security measures when accessing patient records

remotely. This suggests that while the system's capability for shared, real-time access is valued, further exploration of usage frequency and data protection protocols would be important to fully understand its impact and potential risks.

> *Now, with this system, you can consult and collaborate with other medical officers remotely. Doctors from their homes can view patient records and advise attending nurses on what to do. They can also simultaneously view and discuss patient parameters and agree on patient management. It doesn't have to move from one person's hands to another before both can have access to the same information. A lab person can be working on a person's folder at the same time that the nurse, pharmacist and doctor are working on that same folder in their respective departments (R1).*

Patient Record Quality

The results indicated that EHR enhances the quality of patient records by ensuring the capture of accurate and relevant information. For instance, the system's algorithm prevents incorrect information from being entered into any section of the patient's record.

> *Before the implementation of the EHR missing folders where a common occurrence and was leading to multiple folders for one patient. Once a patient folder is missing, the medical records of the patients are also lost. When a new folder is made, then later the missing one is found leading to multiple folders for one patient. Moreover, when you're entering patients record, the system is designed to help you avoid errors. Say, you have entered that the patient is a male and mistakenly enter that he is pregnant. The system will alert you of the abnormality in the record you entered (R6).*

Waiting Time Reduction

This improvement was particularly noticeable in the records unit, where the collection of folders in the paper-based system previously took a considerable amount of time. Both patients and staff observed that EHR has streamlined the process, significantly reducing the time required to transfer clients from one department to another.

With the electronic system, the queue moves fifty percent faster especially at the folder registration desk and pharmacy. Some places like the laboratory are still the same as before (R8).

We see that things move fast here because of the electronic system. Before the system, there will be long queues of patients outside here but as you can see for yourself, there are only a few people just passing through the system. This is because unlike the old system where you have to go looking through a lot of folders to find a patient's folder, with this system, you just have to enter the patient ID and that's it, you can register the client for that day (R6).

Avoidance of Waste

The responses revealed that the EHR system helps to minimize waste, including the waste of supplies, equipment, energy, and ideas. Respondent 7 (hospital administrator) observed that tasks which previously required multiple staff can now be managed by fewer people thanks to the EHR system. They explained, "Back then you would need many hands searching for folders on the shelves, but now just a few people behind computers can handle all our clients. The other hands are now in other departments doing other jobs." While this highlights perceived efficiency gains, the data did not include quantitative evidence confirming an actual reduction in staff numbers or a formal reallocation of roles. Additionally, none of the respondents discussed possible ethical implications, such as the risk of job loss or changes in workload distribution, which could affect staff morale and patient care. This suggests the need for further investigation into whether these perceived efficiencies translate into measurable organizational changes and how such changes are managed ethically.:

The work that we would have needed two people to do, now only one person can do it. Let me say the records unit. Back then you will need many hands to be searching for folders on the shelves and all that. But now, we have only a few hands behind the computers and there are able to handle all our clients. The other hands are now in other departments doing other jobs (R7).

Error Reduction

The study observed that EHR is less prone to errors due to its role in reducing writing and recording mistakes. While many respondents agreed that the manual system was also safe, it was evident that EHR was perceived as equally safe, and for some, even safer to use.

> *Medical workers try as much as possible to avoid harm to patients with both electronic and manual. This is because there is always a pharmacist available to check errors in prescription. But the electronic system makes it easier to detect and rectify errors than the manual where an error is detected, one needs to go through a lot of folders to correct those (R5)*

> *During surgical operations, there are lots of protocols to follow; all the needed instruments are checked electronically before operations begins so no harm is caused. The protocols with EHR are tighter to avoid harm than in the manual era (R1).*

Cost Saving

The majority of responses from participants highlighted EHR as an effective cost-saving system. This was a consistent theme throughout the data collected.

> *As an administrator, I will say EHR has reduced our monthly costs by about ten percent. We don't have to buy that much stationery anymore. We buy only a few packs of plain sheets for some official work and that is all. No need to buy folders, and other writing materials. The system is saving us a lot of money (R7).*

Billing issues have been effectively addressed with the implementation of the EHR system. Analysis of the responses revealed that users agree EHR has resolved challenges associated with billing prior to its adoption. As a result, the efficient and fraud-free billing process has enhanced the facility's revenue generation. The pharmacist's response encapsulates the general sentiment on this topic.

> *Hitherto, we had lots of challenges with billing. From wrong quotations, illegal collections of monies from patients to revenue leakages via all sorts of means. It was bad. But thanks to the system, almost all of that is resolved. There is no way the system will allow wrong billing. For example, at*

the pharmacy. If you enter that this is the drug that you are issuing, and the quantity, the system automatically records that, cost it, and it will reflect at the records and accounts office. If the patient has to pay any money, it has to be in the system, and only paid when the system request is available. There is no way you can pick any money from any person when the system has not requested for it and if the system requested for it, then it comes to the hospital accounts and not to individuals. The algorithm in the system will flag any illegal fees and draws the attention of higher authorities (R5)

Ease of Identification

Another prominent theme that emerged from the interviews was the importance of EHR in facilitating the easy identification of patients. There was widespread agreement that EHR significantly improves the efficiency of patient identification, ensuring that patients are attended to at the right times and according to their specific needs. With EHR, the likelihood of misidentifying clients or providing care to the wrong patient is greatly minimized.

Oh, with EHR, it is very easy to identify patients. You know there are some people with the same names, both first and surnames. I once witness a case of two patients named Opoku Agnes. It was difficult differentiating them. It's similar with twins who have very similar details in their folders. But with the EHR, it has many patient particulars you can use to search or identify a patient such as the unique ID, the patient's age, etc. So, you can use many parameters to come down to the same patient. It's very easy. Just with a click of a button and you know who is who and everything you need to identify each person (R1)

Management Intention to Continue use of EHR

From the management's perspective, there was strong support for the continued use of EHR in the hospital's healthcare delivery. This endorsement was based on their evaluation of the system's benefits, which they found to significantly outweigh its drawbacks. Both the hospital administrator and the laboratory scientist underscored this sentiment, stating:

...Of course. everybody wants to continue an initiative that has been this beneficial to the hospital.

We are not saying it doesn't come with a cost, but on a whole, this is an initiative we will want to continue to use and improve over time (R7).

Yes, we intend to continue to use this system. It's one of the best systems as far as delivering timely services is concerned that we have seen in this facility (R4).

Client Feedback

Clients felt that the EHR system improved the care delivery process by reducing waiting times and minimizing unpleasant interactions with other patients and caregivers. The following remarks from some clients illustrate these findings:

Now, I feel the process is smooth and seamless because we don't fight over who is in front or behind me in a queue, you wait and your name is mentioned (R10)

For me, the queues move faster than before. You don't use as much time as before. Before now, when I come to hospital sometimes, I go home in the evening but now I come in the morning and within some few hours I'm on my way going home (R12)

Similarly, management has received positive feedback that reinforces their commitment to using EHR. A note in the hospital's suggestion box, for instance, highlights how one satisfied client praised the system.

...And even yeah, we have even received some notes in our suggestion box about the use of the system here. The patient was happy with our quick services because of the records system we use (R7)

Mixed Reactions to EHR

Some respondents expressed mixed feelings about the impact of EHR on their waiting times at the hospital. According to them, despite the implementation of EHR, the overall waiting time remained unchanged. They noted that the only noticeable difference between the manual system and the EHR system was at the

folder collection point, while other aspects of their experience, such as waiting for hours to be attended to, remained the same.

> *Waiting time is reduced under the implementation of EHR but not in every aspect. At lab you wait longer and when there are a lot of patients too you delay but in general, waiting time has improved as compare to the manual time. Again, with the electronic, when you are going to see a general practitioner it's faster in terms of waiting time but when waiting to see a consultant it's still long (R 8).*

> *Waiting time is still the same whether manual or electronic. There is no difference. Same long queues, same delays. It's even sometimes worse with the electronic when the system is slow or poor network. Sometimes you will be there and they will come and tell you there is no network (R10).*

Impact on Quality Healthcare Delivery

Enhanced Patient Experience

Services like the ability to book appointments with clinicians before visiting the hospital have significantly enhanced the overall patient experience with EHR. Additionally, the streamlined clinical processes, improved accountability, and increased accuracy associated with EHR have further contributed to a positive patient experience at the hospital.

> *I am very happy with the overall services provided by the Hospital. I think it's because of the electronic system. things here move faster, and there is a sense of civility and order. You feel like you are receiving high class service (R10).*

Customer Satisfaction

According to the clients, EHR significantly enhanced their satisfaction and perceived satisfaction with care delivery at the hospital. This improvement was evident in the overall quality of service, responsiveness, respectful interactions, and the achievement of better health outcomes after receiving care. Respondents attributed these positive outcomes largely to the implementation of the EHR system.

The electronic has helped to enhance the services at the pharmacy. All patient's records are kept confidentially, only the doctors and probably the pharmacist get to see and work with those records. With the folder system, others were seeing the patient's records. Even some of the patients were looking at their own medical records and were getting depressed for seeing their own condition. Others were running away from treatment having seen their records and others went to the extent of killing themselves. The electronic system has helped to protect the patients' information than the manual era (Respondent 6)

From the patients' perspective, satisfaction with service delivery was primarily influenced by how EHR impacted waiting times and the confidentiality of their information at the hospital.

Yes, to some extent when you compare with the time that they were not using EHR. The electronic system gives much satisfaction because your information will not get lost compared to the manual, the only problem with the EHR is the network problem. The satisfaction level is the same with both manual and electronic because the services have not changed. It is just the records keeping and transmission that has changed (R12).

Improved Requisition Quality

The data indicated that the quality of medical requisitions improved with the use of EHR. Clinical staff, in particular, appreciated how EHR facilitated better service requisitions. The process was not only simple and convenient but also quick and reliable, largely because it reduced errors and eliminated issues with illegible handwriting.

I can tell you for a fact that the manual system was ridden with lots of issues about requests ranging from illegible handwriting of some staff to loss of some request sheets and others. Patients have to carry request from one department to another with some patients or their guardians losing these requests, soiling them or even having them torn. But with the EHR, every request is back up and can always be referred to whenever there is the need. Also, requests are sent as soon as they are made and seen at the receiver end ASAP (as soon as possible) (R2).

Offer the Right Care

Due to the aforementioned benefits of EHR, the staff believe that EHR positively impacts overall patient care by contributing to the maintenance of quality patient records and ensuring accurate and high-quality service requisitions. This, in turn, facilitates effective communication and collaboration among healthcare providers, ensuring that each patient receives the best possible care.

> *The overall set up of EHR is designed to improve the way we deliver care here. Generally, I would say, the quality of service we deliver using the electronic system has improved. There is equitable distribution of service because computer doesn't have personal relations with anyone. Moreover, because of the reduction in identity errors, everyone the right care that has been intended for them (R3).*

DISCUSSION

The implementation of Electronic Health Records (EHR) at Our Lady of Grace Hospital in the Asikuma Odoben Brakwa District has transformed several aspects of healthcare delivery. It has brought improvements in efficiency, data accuracy, patient privacy, and cost-effectiveness, although these benefits are not evenly distributed across departments.

One clear impact reported by respondents was increased operational efficiency in many areas of the hospital. Staff described how digital records reduce time spent locating patient files, especially at the registration desk and pharmacy, resulting in shorter waiting times for patients. This aligns with broader EHR research showing efficiency gains when manual record retrieval is replaced by digital access (Blumenthal & Tavenner, 2010; Ngafeeson & Uffenheimer, 2021). However, this improvement is not universal: the laboratory department continues to face delays, and respondents frequently mentioned network issues that interrupt service delivery. These challenges highlight a critical limitation: EHR systems depend heavily on stable IT infrastructure, and efficiency gains can be undermined by technical interruptions. Moreover, the Technology Acceptance Model (TAM) helps explain why perceived usefulness was higher in some departments than others—where the system fit existing workflows, acceptance was

greater, but where workflows were more complex, benefits were less pronounced.

In terms of data quality, respondents consistently emphasized that the EHR system reduces common errors linked to manual record-keeping by flagging mistakes before data is saved. This perceived benefit echoes findings in Aduful et al. (2018), although the current study did not measure error rates directly. Real-time data validation, as described by staff, helps ensure greater accuracy in patient records. However, it is important to note that no quantitative analysis of error reduction was conducted, and claims of improved data quality are based on user perceptions rather than measured outcomes.

Privacy and data security emerged as another frequently cited benefit. Respondents explained that the EHR restricts access to sensitive patient records, making them available only to authorized personnel like doctors and pharmacists. This is a significant shift from the manual system, where files could be physically accessed by anyone. However, the study did not explore what specific security measures (e.g., access controls, encryption) are implemented in practice. Additionally, strong statements about prior data breaches leading to severe outcomes, like patient suicide, were not supported by documented evidence and should be treated with caution and sensitivity. The perceived improvement nonetheless aligns with broader literature emphasizing EHRs' potential to strengthen data privacy (Buntin et al., 2011).

On cost-effectiveness, the hospital administrator noted reduced expenditure on paper records and physical storage. Staff also described reallocation of personnel: tasks that previously required multiple people can now be handled by fewer staff members. However, the study did not collect financial data or conduct a formal return on investment analysis. As such, conclusions about cost-effectiveness should be treated as preliminary and based on qualitative perceptions rather than financial audits.

Challenges emerged clearly across responses but were addressed only briefly in earlier drafts. Some staff described difficulty adapting to the system, particularly those less confident with typing or computers. Technical issues, such as system slowdowns or network failures, were also reported and occasionally required IT support. According to TAM, perceived ease of use directly affects acceptance: participants who struggled technically tended to express lower satisfaction. The success of the EHR, therefore, depends not

only on technical implementation but also on capacity building, ongoing training, and reliable IT infrastructure. Previous literature similarly emphasizes that training and organizational support are key to sustained EHR adoption (Ngafeeson & Uffenheimer, 2021).

Patient perspectives were largely positive. Respondents perceived improvements in processing times, professionalism, and confidentiality of records, which contributed to higher satisfaction. However, the phrasing "appears to have improved satisfaction" is more accurate, reflecting that this study did not use large-scale patient satisfaction surveys or measure statistical significance. Network outages and system downtimes were a source of frustration among some patients, highlighting that technical reliability directly affects the patient experience.

Despite the generally positive findings, this study has clear limitations. It relied on qualitative perceptions without collecting quantitative measures of error rates, patient waiting times, or cost savings. Findings are based on a single hospital case study, which limits generalizability to other settings with different infrastructure and staffing models. Further, the absence of documented security protocols and financial data makes it difficult to draw firm conclusions about data protection and cost-effectiveness.

The results nonetheless have policy relevance. They suggest that EHR implementation strategies should include targeted training, investment in robust IT infrastructure, and continuous monitoring of system impact. Policymakers may also consider integrating user feedback into system design to better align with daily workflows, increasing perceived usefulness and acceptance.

In summary, the introduction of EHR at Our Lady of Grace Hospital has been associated with perceived improvements in efficiency, data accuracy, patient privacy, and cost-effectiveness, supported by some of the broader EHR literature and explained through the lens of the Technology Acceptance Model. However, challenges—including network reliability, user adaptation, and lack of quantitative evaluation—remain significant. Addressing these challenges and grounding future work in both qualitative and quantitative data will be essential for maximizing the EHR system's long-term value.

CONCLUSIONS

The study demonstrated that EHR is widely used in all departments of the hospital. Both clinical and administrative staff use and interact over the platform to deliver their respective services. The staff acclaim the usefulness of the system in its ability to get work done more efficiently and effectively than the paper-based system. However, challenges such as intermittent power outages and the cost of remedying that pose a challenge to the ease of use of the system. Further, the use of EHR translated into improved quality of care in reducing waiting time, cost saving, delivery of safe and harmless care, ease of identification, avoidance of waste, customer satisfaction and increased revenue generation through proper billing

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Credit authorship contribution statement

Edem Ofori: Conceptualization, Methodology, Investigation, Data curation, Writing – original draft. **Edem Ofori:** Methodology, Supervision, Resources, Formal analysis, Validation, Writing – review & editing.

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APPENDIX

Researcher Reflexivity Statement

The research team acknowledged their prior experience with digital health systems, which could influence data interpretation. Reflexive journaling and peer discussions were used throughout the study to mitigate bias.

Validated Interview Guide

The semi-structured interview guide was developed based on TAM constructs, piloted with three participants, and refined for clarity and relevance. Modifications included simplifying technical language and adding prompts about daily workflow impact.

Pilot Testing Notes

Pilot interviews revealed that some participants misunderstood technical terms. Questions were rephrased, and additional examples were added to ensure understanding.

Guide Modifications

Based on pilot testing feedback, the guide was adjusted to reduce jargon, include patient perspective questions, and better explore perceived ease of use and usefulness.