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REVIEW ARTICLE

# Implementation of Electronic Health Record System in Ghana: A Review

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**Abstract:**

There are several pieces of evidence to prove that electronic health records (EHRs) can improve the quality of service, efficiency, safety, and positive patient outcomes. Past decades have seen rapid growth in EHR system implementation in healthcare institutions in developing countries. Effective implementation of EHR system provides a unique opportunity to collect a wide range of patient data to support health tracking over a time period. This study seeks to make a case as to why despite some EHR system implementations in Ghana, there has not been any significant improvement in patient outcomes. This research is not a systematic review but assesses the implementation challenges of EHRs in Ghana. Several papers were identified by searching through some databases, including Google Scholar, PubMed, and Medline, using the following topics: EHR implementation, EHR implementation challenges, and EHR system implementation and EHR challenges in Ghana. The approach to the implementation of EHR system largely depends on the country dynamics and does not necessarily follow top-down or bottom-up methods. The focus should also be on the institution and whether they have the resources to make the project implementation successful. End-users should be an integral part of the whole implementation process, and their recommendations should be followed and implemented.

**Keywords:** Implementation, Electronic system, Health records, EHR, Patients, Health tracking.

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## 1. INTRODUCTION

The use of electronic health records (EHR) has become increasingly important because of patient safety awareness and improved patient outcomes in many countries [1]. However, there have been challenges with the implementation of the EHR system. There are several pieces of evidence to prove that EHR can improve the quality of service, efficiency, safety, and positive patient outcomes [2]. Past decades have seen rapid growth in EHR implementation in healthcare institutions. Effective implementation of EHRs provides a unique opportunity to collect a wide range of patient data to support health tracking over a period [3].

Governments of many developing countries are making efforts to promote the use of EHRs to improve healthcare. In Ghana, the government started the pilot implementation of an EHR system in 2017 in some selected healthcare facilities. However, EHRs must be professionally designed, developed, implemented, and used. Electronic health records (EHRs) will transform the way data are collected and stored to make the delivery of healthcare smooth and seamless. Electronic health records (EHRs), when implemented with other allied systems, such as Computerised Provider Order Entry (CPOE) and Clinical Decision Support System (CDSS), have the potential to improve the quality of service provided to patients [4]. Electronic health records (EHRs) provide a continuous record of patient information across several health institutions and specialists. Electronic health records (EHRs) also ensure secured access to patients' records in real-time [5], and they play a major role in the daily decision-making process at the healthcare facility and impact public health policies.

The National Health Insurance Authority (NHIA) in Ghana introduced an electronic claims system which forced some health facilities to include a computerised system in their operations [6]. At the time, most hospitals were dealing with manual health records systems (folders). This software was privately sourced and could not interoperate with other systems. So public hospitals had implemented their own EHR system without following any guidelines since there were none. It was necessary that one EHR system be implemented to remove the challenges with interoperability.

The Ministry of Health (MoH) and Ghana Health Service (GHS) have been implementing an EHR system in some health facilities across the length and breadth of the nation [7]. The EHR implementation has been found to have several challenges, such as challenges with data retrieval and networking.

Governments worldwide appreciate the benefits of

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electronic health records (EHR) and have been upbeat about its implementation. Although research shows both the positive and negative outcomes of the implementation of EHR, there is ample evidence to show that a proper implementation of EHR improves patient outcomes [7]. This study seeks to make a case as to why despite some EHR implementations in Ghana, there has not been any significant improvement in patient outcomes.

### 1.1. Ghana e-Health Project

The Ministry of Health (MoH) developed the Ghana e-Health Strategy in 2010. The e-health project was aimed at establishing a 24-hour data centre that housed the functions of health information management and disease surveillance [8]. The MoH wanted the data centre to also serve as an early warning system for the health sector. All hospitals, clinics and health centres were expected to be networked with all the agencies under MoH. The project included the installation of an EHR system as well as a patient management system. These systems were to integrate with the NHIS claim management system [8].

## 2. METHODS

This research is not a systematic review but assesses the implementation challenges of EHR in Ghana. Several papers were identified by searching through some databases, including Google Scholar, PubMed, and Medline, using the following topics: EHR implementation, EHR implementation challenges, and EHR implementation challenges in Ghana. Moreover, interactions with some of the implementing units of some of the healthcare facilities were helpful in this article.

### 2.1. Governance, Leadership, and Organisation Culture

Governance, leadership, and organisational culture have been identified as vital in ensuring a successful implementation of an EHR system [9, 10]. Governance and leadership play a key role in the implementation of any EHR system. The combination of bottom-up and top-down approaches serves as a good platform for the successful implementation of the EHR [11]. Since the EHR system was a top-down approach and the end-users were not fully involved in the whole process of implementation, the rate of success was reduced. Some bottom-up approach would have assured end-users of certain independence and would have led to strong support for the implementation of the project [12]. These combined approaches would have helped to engage both policymakers and end-users to ensure the successful implementation of the EHR.

In the implementation process, several factors are involved, which can either positively or negatively affect the EHR system. Although the format of the implementation was the hybrid one, there was a shift towards the use of paper records because workers saw the various challenges that came with the EHR system. Facilities under the MoH and GHS have similar organisation cultures. They are all supposed to submit monthly reports to MoH and GHS. The workflow systems are also similar. Thus, any EHR system should be able to meet the organisation culture of workers to make the transition to the EHR smooth.

In Ghana, the implementation of EHR was championed at the government level. The Ministry of Health (MoH) and the Ghana Health Service (GHS) piloted the EHR system in some healthcare facilities. According to the MoH and GHS, the data centre is located at the headquarters and all the EHRs in the hospitals are connected. This means that patients can visit any facility, and that facility can still have access to the patient medical records. This could be beneficial to clients and patients who visit such facilities if the system is working as it is supposed to be. However, the implementation of the EHR system did not consider the local infrastructure of the various facilities. Government should have conducted a survey to ascertain the status of the network infrastructure before implementing the system. Most of these hospitals have poor network infrastructure, which makes them unsuitable for the implementation of any EHR system. Thus, the implementation of the EHR system has not translated to the quality of service provided to clients and patients. This may be because of the type of implementation process that was employed.

### 2.2. End-user Involvement and Training

End-user involvement in the process of EHR implementation has been seen as an important factor [13]. This helps to ensure that the EHR system meets end-user needs, requirements, and workflows. The involvement of end-users also promotes some sense of ownership and acceptance [14]. End-user involvement in the implementation of the EHR system is crucial to ensure its success. When end-users are involved in the implementation process, they help identify challenges so that they can be addressed to make the implementation achieve its goal. End-users must be part of the whole implementation process.

The lack of training, user resistance and lack of awareness of EHR have been recognised as some of the challenges to the implementation of EHR [13]. Addressing end-user concerns about the perceived usefulness of the EHR system and ease of use is a sure way to ensure smooth implementation of the EHR system [13, 15]. Misunderstanding of clinical and administrative users of the benefits of the EHR system has been identified as a barrier to the effective implementation of the EHR system. The fear of change can also lead to implementation challenges.

The MoH and GHS did not fully involve the end-users in the EHR implementation process [3]. This has made some healthcare institutions totally abandon the EHR system to continue with their paper records. Champions (influential and knowledgeable people within the facilities) were not appointed in the facilities to push the implementation process. When champions are appointed within the end-user group, they serve as a link between the end-users and the IT team [4]. These champions must be respected within their ranks and must have the relevant knowledge to help achieve the goal being sought after.

Basic computer training is important for the smooth implementation of the EHR system. This is especially useful for end-users who are not so competent in the use of computers. An EHR-specific training is required to introduce end-users to the EHR software. Training is identified as key to

a successful EHR implementation [5]. In the implementation of the EHR for MoH and GHS institutions, training was organised but did not involve all staff. This affected implementation because sometimes, the person who was trained may not be available, but the system must still be used. This gave way for those health professionals who were not trained to write their reports on sheets of paper to be later inputted into the EHR system.

For physicians, the implementation of the EHR system changed medical practices and behaviours that were difficult to accept [16]. The difficulties might have come from logistical issues as well as changes in the workflow structure of the physicians who were expected to use the EHR system [16]. Research indicates the return on investment (ROI) and lack of policy support as issues that can affect the implementation of EHR systems [17]. The successful implementation of an EHR system will need the commitment and support of top management [18].

### 2.3. Support

Implementation requires constant support to help achieve the goals of the EHR system. This support can come from management and policymakers. Technical support is an essential part of the entire process of implementation. The failure of some of these implementations was due to a lack of technical support and the response time from these support systems. When support is identified but the response is slow, end-users would abandon the system.

Experts in external and internal support are critical to the successful implementation of the EHR system [4, 6]. Peer support for end-users is also critical to improving the use of the EHR system [6]. Some of the facilities have IT support units, which are immensely helpful in the implementation of the EHR system. There are small facilities that do not have any IT support unit, and therefore faced many challenges in implementing the EHR system. Some of these challenges included network failure, slow network, server issues, and others.

### 2.4. Workflows

The implementation of EHR must meet the workflow practices of end-users [7]. The success of EHR system implementation would be based on satisfying the workflow requirements of the end-users. Re-engineering workflows during EHR implementation can bring about efficiency, satisfaction, acceptance, and productivity [6]. The implementation of EHR at the MoH and GHS healthcare institutions followed some of the workflows. The major challenge with the EHR system is report generation, which was not part of the implementation of the EHR. The EHR that was implemented did not consider the process of reporting to the various levels of the healthcare organogram.

End-users are obliged to manually prepare reports, send them to the regional health directorates to be forwarded to the national office. This creates avenues for underreporting and overreporting of figures. To ensure quality data, it would have been best for the EHR to generate its own report to be sent directly to the next level on the organogram. Integrating EHR systems into the healthcare facilities' workflow [19] may be met with strong resistance if it increases the workload of end-users.

### 2.5. Human Factors

Some of these human factors include IT skills and the personal characteristics of end-users, and these impact the success of the implementation of EHR systems [6, 9]. It is therefore important to add IT skills training to the implementation of an EHR system. Although age and gender play a role in IT acceptance and use, when training is factored into the implementation, it reduces the rate of non-compliance and use of the EHR system [10]. The success of EHR implementation largely depends on the end-users [7] and their ability to use the system.

### 2.6. Infrastructure

Improvement of infrastructure is key in the implementation of the EHR system. Hardware (computers, routers, etc.) plays a major role in the success of an EHR system. Healthcare institutions may need computers and good network infrastructure for communication and proper use of the EHR. Some of the challenges faced during implementation are the availability of computer resources and well-functioning network infrastructure. Some of these hospitals do not have the capacity to procure computers and other hardware resources for the implementation of EHR [4, 10, 11]. The government, through MoH and GHS, provided some computers during the implementation process. However, these computers were not enough.

A good ICT infrastructure should be available and should be able to help the EHR system function at the optimum level [20, 21]. Software interoperability was a problem for the smooth implementation of the EHR system. Off-the-shelf software applications are unable to meet the demands of healthcare facilities and present challenges that come with ease of use. The development of software must follow the required processes that involve stakeholders to understand their demands and what they expect from the software [14]. The availability of fast internet and adequate telecommunication coverage can fast-track the implementation of EHR systems and accelerate any country's e-health development [22].

## 3. DISCUSSION

The MoH and the GHS have been implementing the EHR system in some health institutions for the past five years. Although some of these institutions are still using the EHR system, others have totally abandoned its use and reverted to paper records. The institutions that are still using the EHR system face several challenges, which include slow network and software issues that do not get any response from external support. When the government fails to follow proper procedures for EHR system implementation, it becomes an impediment to the provision of quality service to patients.

The approach to the implementation of the EHR system largely depends on the country dynamics and does not necessarily follow top-down or bottom-up methods [23, 24]. In Ghana, the approach employed in the implementation of EHR

followed the top-down approach, which has to some extent failed because end-users were not engaged in the process. In the Netherlands, they followed the top-down approach, and it worked, while this top-down approach failed in the UK [25]. Thus, if end-users do not see their relevance in the implementation process of the EHR, they would not own the system to ensure its success. When leaders and managers at the facility level are involved in the process, they fight for the success of the system. But when systems are implemented without following due processes, managers and end-users feel disrespected and may not participate fully in the whole process, thus leading to many implementation challenges. Despite these challenges, proper implementation of EHR brings benefits to patients and the facility.

## CONCLUSION

Implementation of EHR systems must follow and be based on best practices to ensure the success of such projects. Implementers and decision-makers should focus on the success of the project rather than the financial benefits and some political gains. The focus should also be on the institutions and whether they have the resources to make the project implementation successful. End-users should be an integral part of the whole implementation process.

Managers of health institutions should understand that end-users are very important and should involve them at the beginning of the whole implementation process. As part of a policy, leadership should ensure that there are laid down processes for the implementation of systems that involve end-users.

## LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| **EHRs** | = | Electronic Health Records |
| **CPOE** | = | Computerised Provider Order Entry |
| **GHS** | = | Ghana Health Service |
| **ROI** | = | Return on Investment |

## CONSENT FOR PUBLICATION

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## CONFLICT OF INTEREST

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