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Electronic Health Records Use in the Training of Medical Students in Ghana

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Abstract
Electronic health records (EHR) have been changing how patients' records are accessed and used in healthcare facilities. Teaching hospitals have been in the process of changing their patients' records to electronic formats. These transformations make the EHR easily accessible to health professionals and improve the quality of patient service. Nevertheless, the implementation of EHR has come with challenges for medical students' access to patients for their training. There have been legal and ethical challenges that come with access to the EHR by medical students. Generally, medical students cannot have access to the EHR for the training. This can affect the training of medical students who are eventually going to use the EHR to provide service to patients. This paper considers EHR access and its uses by medical students.

Keywords: Electronic Health Records (EHR); Access; Training; Medical students

Introduction

Electronic health records (EHRs) contain patients' health information, including clinical data. Implementation of EHR comes with several benefits to patients and health professionals. The quality of care for patients becomes better because access to patient records is no more a hurdle. Misplaced and lost folders are no longer reported leading to instant access to patient health records [1,2]. EHR improves efficiency, monitoring and evaluation, error reduction, and workflow management [3-5]. The introduction of the EHR accelerates advancement in healthcare delivery and patient care, but it is creating new challenges for medical education.

However, EHR also comes with some challenges, including automation bias and decreased quality of notes because physicians are unwilling to type on a keyboard and copy-paste use [6,7]. Other EHR challenges include alert fatigue [8], disruption of the physician-patient relationship [9] and productivity loss due to EHR usability challenges [2].

Other EHR challenges present themselves in teaching hospitals. These challenges relate to students' access to the EHR for teaching and learning. It is a challenge in Ghana, and no one is concerned about it. However, despite their exposure to Information and Communication Technology (ICT), medical students still require training in EHR systems. According to previously reported research, medical students generally assess their ability to use EHR systems as low [3,10-13].

The Ghana Medical and Dental Council, an accreditation body, expects graduates to communicate their investigations clearly in writing and orally. This requires that medical students be trained in using the EHR, especially EHR documentation. Accreditation bodies also expect graduates to know about

the documentation process in electronic patient folders [14-17]. However, there are no discussions on how to integrate such training into the medical curriculum and expected competencies to be included in the curriculum [3,15,18]. Berndt and Fischer [15] concluded that using EHR for training medical students introduces new challenges. The use of the EHR makes it necessary to assign roles and responsibilities to medical students and their clinical teachers [15]. These new access roles would make it possible for medical students to access the EHR for their learning [3].

Medical students need to have individual login details so they can access the EHR. It is also possible to introduce medical students to simulated EHRs. Simulated EHRs can be used in training, but medical students may still need access to the actual EHR in their clinical years for their learning. Currently, simulated EHR is rarely used [19]. Access to the EHR must be governed by roles and responsibilities for medical students considering the legal framework and policies governing access and use of the HER [19].

In summary, medical students would need access to the EHR for their training. They need to acquire the necessary skills to help them use the EHR to provide quality service to patients when they become medical doctors. The EHR is gradually becoming the main form of patient records, and medical students must be trained to use it. Training guidelines must exist for training medical students on using the HER [3,10,15]. As a matter of urgency, medical schools should introduce the teaching of the EHR as part of the curriculum to medical students. Medical students should be introduced to the proper use of the EHR for patient care as well as professional communication [20]. Atwater et al. [9] concluded that "*best practices and strategies for teaching medical trainees in the setting of EHR have not been identified or widely shared with the medical education community.*" Our study aimed to assess EHR use in students' medical training in Ghana.

Medical Students Access to Electronic Health Records

Medical training in Ghana has two main cycles, Cycle 1 (preclinical) and Cycle 2 (clinical). During the preclinical stage, students do not have the opportunity to see patients at the teaching hospital. Medical students go for ward rounds with their teachers during the clinical stage of their training. The preclinical years can be three years, one and half years, or one year depending on the entry qualifications. The clinical years are normally three years for all entry qualifications.

Studies conducted by the Liaison Committee on Medical Education (LCME) from the 2011-to 2016 academic years permitted some form of access to EHRs at their clinical teaching sites. Access levels across training institutions were not the same. Medical students were allowed to only read-only and were not permitted to modify or add any information (data unpublished) [21].

Another study in 2012 by the University of Michigan Medical School and Alliance for Clinical Education showed a limited scope of EHR access and use by medical students. The study showed that 32% of clerkship directors or clinical coordinators permitted students to only view the patient records; 41% permitted medical students to view and write to the patient record; and 27% permitted medical students to view, write and enter orders which were to be co-signed [10].

Implications of Non-Access to Electronic Health Records

Medical students require full access to the EHR to help them learn how to record findings electronically, retrieve health information from the EHR, and elicit medical histories. No access here to EHR means that many students will finish medical school, and would lack core skills in EHR use like patient charting, and locating and interpreting laboratory results in the HER [22].

Limited access to the EHR during medical school may result in many housemen and women spending considerable time in their training familiarising themselves with the HER [23]. While access to the EHR can encourage students to use their clinical reasoning skills in real-time, there are concerns about the potential negative impact on students' learning. For example, using electronic templates as prompts may limit students' ability to learn basic history-taking and physical examination skills. The use of the EHR by students must be taught carefully. When the use of EHR is taught well,

it will help them actively engage in, integrate, and document the patient encounter. Teaching the use of the EHR will help ensure the ethical and correct use of copy and paste features that come with the EHR's use [24].

Medical schools can use simulated EHR for the training of medical students. The use of these simulated EHR can help bridge the gap of no-access to the EHR. The simulated EHR would help students develop EHR competencies. Medical schools in developing countries can consider using these simulated EHR packages to assist in the training of students [25]. Students must learn how to use clinical decision-making tools, communicate with other providers, and provide management plans [26-28].

Simulated EHR cannot be a permanent solution to the no-access to EHR syndrome. Medical students should be granted some form of access to the teaching hospital's EHR for their training. A study conducted at the Oregon Health and Science University and the University of Texas Health Science Centre indicated that students performed well when they were tested on the use of EHR during an objective structured clinical examination (OSCE) [22]. But the students lacked EHR data management skills such as medication reconciliation, medical history review, and allergy reconciliation [22]. No medical school in Ghana currently tests medical students on EHR using OSCE. This shows that students should be granted access to the EHR so that they can acquire the relevant skills. Teaching hospitals must put in place policies to give medical students access to the EHR while in training to help them perform well when they eventually complete their training [22].

Benefits of Electronic Health Records Access to Students

Access to the EHR by students may come with some benefits. Access to the EHR may expose students to the larger healthcare delivery system. This would be possible if EHR are implemented across the country. Students would become exposed to systems-based practice, which includes cost-effective care for patients. They would be exposed to tools to enable healthcare team members to find patient care goals for documentation and also monitor progress using a shared plan [26]. The EHRs may act as a tool for faculty to supervise students' performance and offer useful feedback during clinical rotations. Faculty guidance and feedback can help students focus their attention on patients and not on the EHR. Faculty feedback can help students enter data correctly to prevent EHR errors [22].

Preclinical Years

The preclinical year students can be introduced to the simulated EHR in the third year of their medical training. The main objective of introducing EHR training for students in the preclinical years is to offer students the opportunity to become knowledgeable, comfortable, and familiar with the EHR and how it is directly integrated into clinical medicine and practice. When students become EHR literate, they will be ready for their clinical years.

The teaching of EHR can start with an overview of the EHR as a healthcare tool and its effect on healthcare delivery. Medical students could be introduced to data entry using the simulated EHR. This would help them learn the skill of history taking using the EHR. The preclinical years can employ these simulated EHR in the second semester of the third year to introduce students to the concept and provide them with some hands-on practical use of an EHR before starting the clinical years.

Proper integration of EHR can be done when there is an actual course/module for EHR learning. Other aspects of EHR can be incorporated into the preclinical curriculum through problem-based learning (PBL) sessions [27]. Thus, medical schools must provide specific courses or tutorials that specifically introduce students to the use of the EHR.

Clinical Years

As medical students move to the clinical years, they should know the rationale, format, and approach for documenting patient encounters in the EHR using the simulated version. Students would be aware of the wealth of health information in the EHR. Medical students should be granted full access to the EHR for them to appreciate the role EHR plays in the healthcare delivery process. Students should be trained in using the EHR during the orientation course/module in the clinical year. These courses/modules should introduce students to all aspects of the EHR. They can be taken through critical hands-on experiences to appreciate how the Clinical Decision Support Systems (CDSS) and Computerised Provider Order Entry (CPOE) components of the EHR works.

Curriculum committees or clinical coordinators should develop specific objectives for using the EHR by medical students. Clinical coordinators/educators should establish clear goals to help medical students achieve key EHR competencies. These EHR competencies may include patient care, communication, documentation, professionalism, medical orders, and decision-making. Medical schools must ensure that clinical educators are proficient in using these EHR as they are the primary source of EHR training for the students [28]. Final year students must be engaged more in the use of the EHR to ensure proficiency in the use of the EHR. Knowledge and skill are a must for final year students. Final year students can be introduced to order entry, the use of decision support systems, medication reconciliation (if the EHR system allows that) and data interpretation. Students must be taken through the ethical use of health information. They must be informed about the dangers of copying and pasting patient notes.

It is expected that medical school graduates have been able to master the knowledge and skills of how the EHR functions.

Barriers to Students' Full Access to Electronic Health Records

Laws regulate access to patients' health information kept in EHR systems in hospitals. The training of medical students requires them to have access to patient information. Institutions tend to restrict medical students' access to EHRs for fear of potential legal liability. This legal liability may be related to medical and billing errors [28,29]. Time and cost are major barriers as institutions are unwilling to provide resources for student training and authorizations [20].

There may be some legal and ethical considerations when students are allowed access to the EHR. The medical record is a legal document and must be accessed based on law. Medical students have limited permission to access and use medical records. Medical students' documentation must be co-signed with their clinical supervisor. There is the fear that students may document wrong information. As such, health institutions are careful in granting access to the EHR to medical students.

Conclusions

In Ghana, the role-out of EHR in teaching hospitals has come with several challenges that affect the training of medical students. Medical students do not have access to patient records for their learning. Medical students should be given login details that grant them limited access to patient records with supervision. Authorities in medical schools and teaching hospitals must discuss policies and explore solutions to be put in place for access to EHR by medical students for their training.

As a first step to becoming house officers, medical students require hands-on experience in EHR to understand how to enter orders, and prescriptions and document clinical encounters in the EHR. Restricting medical students' access to the EHRs obstructs skills acquisition for patient records input and laboratory or medication orders.

Medical school faculty can act as champions to promote students' access to the EHR. These champions should represent the interest of students and prove that the barriers can be overcome legally and safely. Medical students must be trained to use the EHR properly. This will prevent them from creating shortcuts to develop clinical narratives. Clinical educators' involvement in the EHR

training would ensure that medical students comply with regulations, hospital rules as well as the ethical use of the EHR.

List of Abbreviations

EHR – Electronic Health Records
LCME – Liaison Committee on Medical Education
OSCE – Objective Structured Clinical Examinations
CDSS – Clinical Decision Support System
CPOE – Computerised Provider Order Entry
PBL – Problem-based Learning
ICT – Information and Communication Technology

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