

Practical Challenges of Setting Up an Electronic Medical Record System in a Nigerian Tertiary Hospital: The Wesley Guild Hospital Experience

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Abstract

There are innovative informatics solutions made for efficient healthcare delivery and electronic medical record system (EMR) is one of such. The immense opportunities it holds for efficient patient care, hospital economics, clinical audit and medical research affirms its superiority over paper-based records.

However, implementing functioning EMRs in environments like ours is fraught with many practical and peculiar challenges. Using the experience garnered from the Wesley Guild Hospital EMR project, this paper highlights these challenges and how some of them were overcome. Our aim is to sensitize other workers interested in doing similar projects in this environment about the likely challenges they might face.

Key words: Electronic medical records, Practical, Challenges

Introduction

Health records exist in basically two formats: Paper records or electronic records. The former can be hospital based or home based (patient-held) while the latter are hospital based. An electronic medical record (EMR) is a medical record in digital format which facilitates access of patient data by clinical staff at any given location(1). This unique quality of EMRs is that they are accompanied by facilities for clinical notes, automated checks for drug and allergy interactions, prescriptions, scheduling, sending to and viewing by laboratories, to mention a few uses. EMRs today evolved from simpler less sophisticated systems which date back to the 1960s. A good example of such is the problem oriented medical record system developed at the University of Vermont in the United States(1, 2).

Electronic records in healthcare are quite useful in some areas: Keeping patient records, facilitating the doctor-patient consultation process (Documentation, Health/drug information/databases, Prompts, Prescribing, Referrals and Investigation requests), helping with patient management (Clinical trends - growth monitoring, Weight, BMI, blood pressure, Drug interaction, Recalls and follow-up), practice management, health records management (statistics) and health research(3).

It is widely accepted that EMRs are superior to paper based records. This is mainly attributed to the non-availability of "multiple access" to paper records i.e. only one person or one group of people can access one paper case note per unit time. Also, natural elements easily affect paper, for example, water, fire, wind and sunlight.(1,5)

Transition from paper based records to EMR, addition of older records to existing EMRs, preservation of electronic records and interoperability are common issues of interest when dealing with EMRs. Bearing in mind the recalcitrant attitude of people to change, willingness to embrace this newer patient record method poses a challenge. Other challenges to be borne in mind are privacy, technological limitations, customization and social/organizational barriers.

Even though the overall global acceptance of EMRs is generally good, utilization of the latter is extremely low in developing countries and even unimpressive in some developed parts of the world. In a 2005 United States National Centre for Health Statistics survey, 41% of office based physicians had no plans of adopting an EMR system within the next 3 years(1). The latter is not surprising given the enormous challenges that have to be surmounted in order to get an EMR system working, especially in a developing nation. These challenges and the solutions to some of them, informed this write up.

HISTORY OF EMRs

History of EMRs dates back to the 1960s when Lawrence L. Weed, an American physician, first described the concept of electronic medical records (which he called computerized medical record). His focus was on creating a system to automate and reorganize patient medical records in order to enhance their utilization and thereby lead to improved patient care(2). His work formed the basis of a project whose objectives was to provide timely and sequential patient data to the physician, and enable the rapid collection of data for epidemiological studies, medical audits and business audits. This was the PROMIS project in the University of Vermont and it started in 1967. Problem Oriented Medical Record (POMR) emerged from this.

In the 1960s the Mayo clinic also began developing electronic medical record systems. In 1970, POMR was first used in a medical ward of the medical centre hospital of Vermont.(1,3)

During the 1970s and 1980s, several EMR systems were developed and further refined by various academic and research institutions e.g. Harvard's COSTAR system, Duke's "The Medical Record" and Indiana's Regenstrief record are a few of these examples(1,2).

DOCUMENTED PRACTICAL EMR ISSUES

Transition from paper based records to EMRs

This is a very important process as both human and computer wares are involved; human ware with regards to acceptance of and proficiency in the use of EMRs and computer ware with regards to appropriate software and hardware (4).

Adding older medical records to EMRs

This ensures a comprehensive health record for any health establishment; needless to say, it is a very expensive and rigorous exercise (2, 4).

Preserving electronic records

This becomes paramount as a backup measure in case of a break down in the system. Planned periodic migration of information is involved here(6).

Interoperability

This is the ability of various information technology systems and software applications to communicate and to exchange data accurately, effectively and consistently and to use the information obtained. Without interoperable EMRs, practicing physicians, pharmacists and hospitals cannot share and access patient information which is necessary for portable health care(4,5) .

COMMONLY AVAILABLE EMRs

Below are examples of available EMR systems/software currently in use globally

(a) SOAPware® - This is used in more than 60 specialties over 27 different countries. It is a leading EMR in use among family physicians and internists in the United States according to a multicentre study by Medical Economics magazine.

(b) OmniMD® - A registered product of ISM incorporated, an American medical solution providing company. Facilities available on it are billing system, medical calculators, prescription writer, and patient reminders, to mention a few.

(c) OpenMRS® - This is a disease specific medical record system specially designed for HIV/AIDS records in developing countries. It was first put to use at Indiana University teaching hospital, Kenya.

PRACTICAL CHALLENGES OF SETTING UP AN EMR SYSTEM IN WESLEY GUILD HOSPITAL

Background

Wesley Guild hospital is one of the six hospitals now remaining in the Obafemi Awolowo University Teaching Hospitals Complex. The Ife State hospital is the largest of these. Located in Ilesa, a town in South Western Nigeria, Wesley Guild Hospital started as a Methodist

missionary hospital in March 1912 with one doctor and two non-medical assistants. The hospital now has specialist doctors in all orthodox subspecialties of Medicine on its service. These specialties are medicine, surgery, paediatrics, obstetrics and gynaecology, haematology, microbiology, chemical pathology, morbid anatomy, infectious disease, radiology, ophthalmology, anaesthesia, emergency medicine and family medicine.

The Family Medicine department is principally responsible for the care of all the outpatients coming into the hospital for the first time. They see such patients, continue the care for people with uncomplicated diseases, carry out minor surgical procedures and refer those with complicated disease conditions requiring hospital admission to the respective subspecialist. The Family Medicine clinic runs Monday to Friday between 8:00am and 4:00pm and two doctors are left on duty from 4:00pm to 8:00am on call basis. In this background of much patient turn over, the Family Medicine department was selected for showcasing the numerous advantages of the EMR system over paper records. The Challenges encountered and the solutions provided are as written below.

Procuring the Software

Software used in healthcare establishments is very expensive. A basic EMR costs about \$32,000 (an equivalent of four million, eight hundred thousand naira) excluding technical support and ongoing maintenance. In an American survey, it was said that it takes 9 months of hard work for the EMR installation costs to be recovered by an office practice. The hospital management, though benevolent in a number of other ways, did not see this as a priority. This is not peculiar to Obafemi Awolowo University Teaching Hospitals Complex as a number of other teaching hospitals have experienced the same thing at different times.

As a result, we had to search for an alternative means. Facilitated by a

Family Medicine faculty member, Communicare® Systems Pty Ltd in Leeming Western Australia gave conditional permission for free professional use in Nigeria. Hence, Wesley Guild Hospital in Ilesa Nigeria became the first Nigerian hospital to use Communicare®. Communicare is a computer resident medical records database. It was specifically designed for primary health care providers that service a defined community and for entities that provide preventative health care, such as Community Health Centres.

Communicare's emphasis is on preventive and managed health care. It provides a comprehensive recall system. It can be used as a recall only system, recording only medical information required to produce recalls. Communicare provides reports for individual patients and community based reporting, such as coverage of the target population for preventive health care procedures.

Special features include

- Medical records by patient
- Automated recalls based on age, sex, date of preceding events and patient conditions
- Explicit support for the following classes of information; admissions, conditions, acute medication chronic medications, history items, immunizations, procedures and referrals
- Recording of qualifiers and test results
- Statistical analysis
- Information grouped into medically significant categories (topics)
- Service recording or clinic attendance summary recording
- Prescribing, including generic prescribing
- Progress notes
- Patients register with multiple patient names and history of patient addresses for a patient.

Technical Limitations (Skilled Information technology Manpower Availability)

This posed another serious challenge, bearing in mind the practice location of our premises. Getting someone to network all our clinic computers was a formidable

task. There were many options but most were beyond the reach of funds available in our departmental purse. After months of searching, an electronic technician eventually agreed to do a cabled networking of our computers.

There are twelve computers in all; one in the records room, one at the nurses' station and ten on the doctors' table.

Following this initial installation, maintenance checks and repairs were always months behind schedule thus hampering the use of the EMR system for these periods of time. A few of the department doctors (I inclusive) are interested in networking but time to acquire the full competencies is not very available. As a result we have to make do with the technician we work with, while doing the little we know how to do. By and large, we usually get by.

Poor electricity supply

For many months, we could not use the EMR consistently because of constant power outage. On some occasions, the power packs in some central processing units of the table-top computers got damaged and had to be replaced. Due to the peculiarity of our facility, the alternative power source serves highly electricity dependent areas of the hospital like the operating theatre and the radiology department as a matter of preference.

This challenge was circumvented by acquiring two 2KVA inverters and four 50Amps deep-cycle batteries. The power wiring was done in such a way that one inverter and two deep-cycle batteries power 6 computers. The inverters have an intrinsic battery charger that charges the deep-cycle batteries which stores the charge when alternating current (AC) source power is available. When electricity is unavailable, the inverter switches into invert mode and converts the stored charges to AC which powers all the computers, making it possible for us to use the EMR.

Organizational Barriers (EMR Utilization by the health workers)

Wesley Guild Hospital is the fifth oldest hospital in Nigeria, with successive generations of doctors, nurses and other health workers well grounded in the traditional art of health record keeping with pen and paper. When the EMR first came, the head nurse of the Family Practice clinic was of the opinion that the system will most likely not work. Considering the fact that five out of the six nurses are not computer literate, her pronouncement might not be far from the truth. Even though the entire doctors have operational computer-based competencies, changing from paper based records to EMR has been a very difficult process. This can be attributed to the fact that they were all trained with paper based training aids.

Appointment of EMR support staff who helped convert the former paper records to electronic records while helping out with imputing of new patient records was our way of rising up to this challenge. As time went by, all cadres of health staff developed more interest in the EMR. Though the utilization improved, this is much less than expected.

Accessing remote assistance
Part of the terms and conditions of installing many types of software is to connect the internet for activation, validation, update or troubleshooting. In order for this to be done successfully, uninterrupted internet connection with sufficient bandwidth and download speed is needed. In fact, for Communicare® to be installed on every computer CPU, one has to connect to the internet after inserting the installation disc into the CD Drive. This has to be repeated for every CPU. An internet connection with a bandwidth sufficient enough to sustain this was a very big challenge. This might not be unrelated to our location (Ilesha, Nigeria) as most broadband internet operators consider Ilesha a non-lucrative market for setting up. This challenge was circumvented by the efforts of one of the department's Consultant who carried the CPUs to his home in another town (a

more cosmopolitan town) where he successfully accessed remote assistance for installing the software.

Conclusion

Electronic medical records have come to stay in today's medical practice. Needless to say, they offers numerous advantages and care enhancing facilities that the tradition paper-based records do not offer.

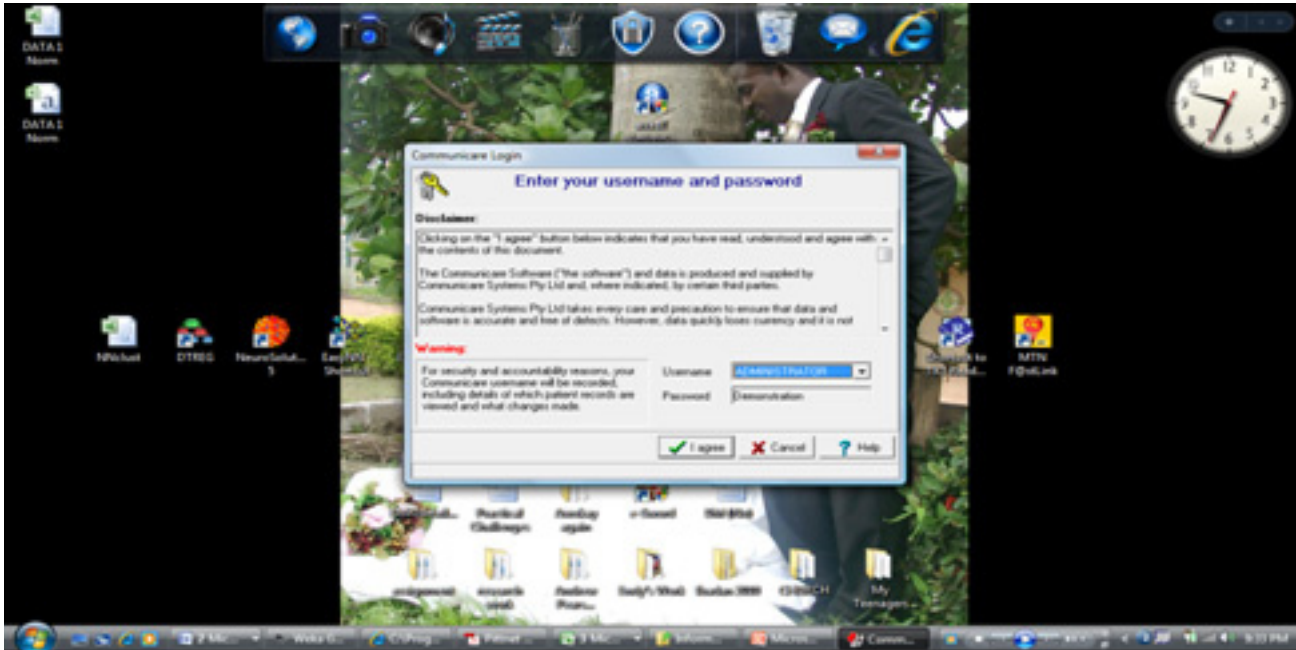
However, the successful execution and continued sustainability of EMR projects in Nigeria is plagued by many challenges which every project team needs to be aware of. If such projects are to succeed in environments like ours, we need to preempt these challenges and proffer practical and effective solutions to them.

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APPENDIX 1- Communicare Log In Page



APPENDIX 2 - Communicare® Disclaimer Page



APPENDIX 3 - A 2 Kva Inverter with Intrinsic Battery Charger



APPENDIX 4 - Two Emerson® 50 Ampere Deep-Cycle Batteries