CASE REPORT

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Implementation of Electronic Medical Record (EMR) at Federal Medical Centre, Ebute-Metta, Lagos, Nigeria

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ABSTRACT

Background: Electronic Medical Record (EMR) is the transformation of patients' medical records from its paper-based format to digital form. This comprises information about the patient's health history, such as diagnoses, medicines, tests, allergies, immunizations and treatment plans. EMR can be seen by all healthcare providers who take care of patients. It is easier to access and update. In the past years, there used to be lots of delays in the retrieval of patients' medical records, misplacement of patients' vital documents and misfiling of case notes. It is against this background that EMR was introduced in FMC, Ebute-Metta, to help eliminate all these challenges. The main objective of this paper is to describe the various processes involved in the implementation of EMR in FMC, Ebute-Metta, Lagos.

Methods: The implementation of electronic Medical Record (EMR) at the Federal Medical Centre Ebuta-Meta started with the purchase of EMR equipment and staff training. Also, scanning and archiving of patients' medical records were carried out. The entire patients' medical case notes were scanned page by page. The scanning processes took place inside the Health Information Management record's library. Librarians play vital roles by initiating the digitalisation process and ensured the smoothness and clarity of scanned documents.

Results: The result of this revealed that the speed of operation in EMR is very high compared to manual method because it significantly reduced patients' waiting time. The challenges encountered in the process include EMR application downtime, power failure, among others.

Conclusion and Recommendation: The introduction of EMR at FMC, Ebute-Metta, was a welcomed initiative, because of its benefits. It has reduced the patient's waiting time and more revenue is being generated. It is recommended that the EMR should be sustained by training and re-training staff.

Keywords: Electronic Medical Record (EMR), Patient's Medical History, Patient's Health Information, Federal

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Introduction

Paper-based records, the traditional way of storing patients' medical information, are increasingly being converted into digital formats known as Electronic Medical Records or EMR. According to the University of South Florida (USF) Health (2020), EMR stands for electronic medical records, which are the digital equivalent of paper records, or charts at a clinician's office. EMR typically contains general information such as a patient's treatment and medical history as collected by the individual medical personnel. The Dictionary of Cancer Terms defines EMR as:

> *An electronic compilation of patient health information which is saved on a computer system and it includes information about patient's health history, such as diagnoses, medicines, tests, allergies, immunizations and treatment plans. Electronic medical records can be seen by all healthcare providers who are taking care of a patient and can be used to make informed decisions on patient's care*.

In their article on EMRs in developing nations, Ohuabunwa et al., (2016) noted that an EMR is a long-term single complete patient health history that emanates from various sources through hospital appointments. Included in this information are patient demographics, diagnosis, progress notes, problems, medications, vital signs, past medical history, treatment plans, immunizations, allergies, laboratory and test results, radiology images and reports.

Objectives

The main objective of this paper is to describe the implementation of EMR at the Federal Medical Centre (FMC), Ebute-Metta, Lagos. The specific objectives are to:

1. describe the processes involved in the implementation of EMR in FMC, Ebute-Metta
2. specify the digital equipment and software used
3. identify the personnel involved in the EMR process
4. outline the benefits gained from implementing EMR in FMC, Ebute-Metta
5. identify the various challenges encountered in the process.

Literature Review

Existing literature shows that EMR is fast becoming one of the modern healthcare tools that has so many benefits which all healthcare facilities should embrace. Previous authors (Hasanain, Vallmuur, & Clark, 2015; Khalifa, 2017; Lambley & Kuziemsky, 2019) quoted in Muhammad (2020), emphasized that there are so many advantages in the use of EMR system. These include increased quality of patient care, effective use of medical resources, increased accuracy in clinical decision-making, promoting patient satisfaction, eradicating medical error, and increased efficiency and effectiveness of staff in performing their duties. Bilimoria et al. (2017) also indicates that EMR increases the quality of services, improves patient satisfaction, ensures accuracy in documentation, reduce medical error and swift access to patient medical record.

According to Ramadhani (2019), one of the benefits of EMR in healthcare facilities is that it enhances and improves the efficiency and quality healthcare services on patient care. Moreover, the EMR can be seen by all health care providers taking care of a patient because it is easy to access and update. From an academic point of view, the EMR is a great instrument for research and planning through the massive data collection available. The EMR is safe, accurate, effective and easy to access by healthcare personnel. Ohuabunwa (2016) also emphasized that one of the benefits of EMR is that it influences health impact clinical interventions and minimizes medical mistakes. EMR also helps to boost the revenue of the hospital, removes cost of unnecessary tests and prescriptions. It also helps the hospital to be less exposed to legal actions.

At the FMC Ebute-Metta, Lagos, the implementation of EMR has been consistent with Ramadhani's (2019) findings. EMR has significantly improved the quality of healthcare services in the Federal Medical Centre, Ebute-Metta, Lagos when compared to manual methods.

Brief History of Federal Medical Centre, Ebute-Metta, Lagos

The Federal Medical Centre, Ebute-Metta, Lagos (FMC EB) has undergone various stages in its transformation from a small medical service to its current status as a Federal Medical Centre. In Nigeria, Federal Medical Centres are secondary healthcare facilities located in many capital cities in Nigeria. The FMC Ebute-Meta was established in 1964 as a Department of Health Services of the Nigerian Railway Corporation (NRC). The hospital was established to serve the health needs of Railway workers and their families. Three years later, in 1967, it was attached to the Lagos University Teaching Hospital where, for the next three years, it catered for injured soldiers during the Nigerian Civil war. Between 1984 and 1985, it served as a referral Centre to parastatals under the Ministry of Transport and Aviation.

The Federal Executive Council approved its transition from Nigerian Railway Hospital to Federal Medical Centre on the 24th of May, 2004. Then, on the 31st of January, 2005, the hospital was formally handed over to the Federal Ministry of Health as a tertiary health care institution and designated 'Federal Medical Centre, Ebute-Metta, Lagos.

The hospital provides specialized medical care in specialities such as internal medicine, general surgery, orthopaedic surgery, obstetrics and gynaecology, paediatrics, dental surgery, ophthalmology, radiology and pathology, and functional dialysis. The hospital continues to develop and sustain a dynamic and comprehensive health service delivery system through highly efficient personnel and with the aid of ongoing training of its professionals and other employees in

various fields. As one of the Federal Government-owned hospitals in Lagos State, Federal Medical Centre, Ebute-Metta offers very highly qualified and patient-friendly medical care services.

Planning and Implementation of EMR at FMC, Ebute-Meta, Lagos

The journey of the EMR project in FMC EB, Lagos was done in stages beginning with the creation of the Information and Communication Technology (ICT) Department in 2017, later renamed the Clinical Informatics Department. This was followed by the deployment of a small number of staff with knowledge of computers and related technologies to the new department. Computer scientists and engineers were employed to handle computer maintenance and networking. A computer engineer was seconded from the Federal Medical Centre, Keffi, Nasarawa State, for two years. His responsibility was to install the EMR Software and train the staff on the use of EMR software and applications which FMC, Keffi, Nasarawa had been using effectively. Additionally, a number of FMC, Ebute-Metta, staff were sponsored on a visit to FMC, Keffi, Nasarawa State, for an on-the spot assessment of the program and how it has been working.

Procurement of Digital Equipment and Software: The first steps towards achieving the goal

The digital equipment needed for the EMR project was procured. Laptops, desktop computers, multi-task scanners were procured, and fibre cables were laid on the ground. A Local Area Network (LAN) wireless infrastructure was set up to serve as the backbone for the deployment of the EMR application. The EMR software being used is the Global Care V.4 Health Management Software. The modules were configured in such a way that each unit is allowed to have access only to the module that is applicable to them. No department is allowed to view the module of other departments or work environments.

Personnel and Implementation Methods

The Health Information Management Officers (Medical Records Officers) in collaboration with the ICT officers and librarians, were tasked with the responsibility of digitization or conversion of case notes of patients into digital format. The entire patients' medical case notes were scanned page by page starting from the last seen. They were usually saved with the patient's name and hospital number for easy identification and retrieval. This was done with the multi-task scanners.

The Health Information Management Officers ensured that the patients' physical case notes to be scanned were well sorted according to the hospital numbers and arranged accordingly. They also ensured that the scanned case notes were identified to avoid double scanning.

The Librarian initiates the scan process and ensures the readiness and smoothness of the documents to be scanned and later checked to ensure the clarity of scanned documents. They also performed sorting and conversion of patients' medical case notes according to names and hospital numbers where necessary. Librarians also edited and carried out quality checks on scanned documents before uploading. The additional responsibility of librarians was and continues to be teaching computer appreciation to staff without a background knowledge of computers. There were no constraints about the librarians having access to the patients' case notes because they possess the requisite qualifications in Health Information Management and their degree in librarianship.

The ICT staff was trained on the use and maintenance of the EMR equipment and other related technology. The staff from different departments were trained on EMR modules. All the staff dealing directly with patients received training on their specific modules. Medical doctors, nurses, pharmacists, medical laboratory scientists, radiologists, dentists, dental therapists, health information managers, account officers, and billing officers were trained on the different modules relevant to their work.

Each of the staff using EMR was given a unique username and password to enable them to log in to the platform, input the required patient information and logout.

Test-Run

The Electronic Medical Record process was kick-started on the 9 October 2019 at the General Out-Patient Clinic (GOPC) with the registration of only new and first-visit patients to the hospital. Two weeks later, all other clinics and wards migrated to the EMR platform.

Implementation Stages: how it all works

Patients were initially registered by health information managers before being directed to online pay points to pay for cards and the consultation fee, both of which are then handled by the Accounts Department. Once the payment is made, the money enters the patient's e-wallet; the patient is issued a scan code card, which is an identifier of personal information. This card has a unique number enabling the patient to access care at every point he/she goes to within the hospital. Wherever the scan code card is used on a card reader, the healthcare provider can view the patient's biodata and the type of care he/she is to receive at that point of care.

With the card in hand, the patient is directed to the clinic, where the nurse attends to him/her by taking vital signs and inputting this information into the EMR nursing module. The nurse then sends the patient to see the Medical Doctor at the consulting room who, on their own EMR module, will then enter the patient's medical details and diagnosis, and if the patient requires a lab test, x-ray, etc., he/she will be sent online to do the necessary tests. The patient takes the scan code card to the lab or x-ray unit where his/her card will be used to view the required tests he/she needs. The results of the tests will be sent online on the patient's portal where the doctor will see the results and give the necessary drug prescriptions. The patient must pay for these services before they are carried out and the amount the patient pays will be loaded onto his/her e-wallet where deductions will be made.

Benefits of EMR to the FMC Ebuta-Metta, Lagos

Implementing EMR at FMC, Ebute-Metta, has improved the efficiency of services in patient care. A patient who is supposed to see two or three different doctors (MOP, EYE and Orthopedic) on a visit will be seen within a few hours by the doctors without waiting for his/ her case notes to be taken from one doctor to the other since the patient's record has been scanned and uploaded on the EMR platform.

Scanning ensures the digital preservation of patients' medical history. EMR ensures effective management of patients' health information: Medical lab results, x-ray results and all others are now sent directly to the patients' platform on the EMR application.

Misplacement and misfiling of patients' case notes is now a thing of the past: The introduction of EMR has really helped to make life easy for the staff. Misplacement and misfiling usually occur when a staff is tired and frustrated about filing huge case notes used on a daily basis in the hospital. With the EMR in place, just a click of a button will retrieve the patient's information.

The speed of operation on EMR is very high compared to the manual method: Time is saved for retrieval of physical case notes and patients' medical history. It usually takes 5-10 minutes or more for a record officer to retrieve a patient's medical case note from the shelf, but now the retrieval is done within seconds on the EMR application.

Huge storage space for the physical case notes was saved: Since all the patient's medical history have been scanned and uploaded to EMR platform, case notes are no longer needed. All have been discarded., thereby saving lots of spaces that was converted to offices for staff.

To a great degree, stress and frustrations has been reduced for the hospital staff particularly on the side of the Medical Records Officers moving from one clinic to another with patients' case notes.

EMR has greatly increased the revenue of the hospital: FMC Ebute-Metta internally generated revenue has greatly increased in the past few years of implementing EMR due to huge patient's patronage from different regions. Patients pay directly into their wallets, which make it easy for proper accountability of funds. It has also done

great things in better and effective management of resources.

Accuracy is achieved: computers always generate accurate statistical results and reports which are used for research and development and also for decision making. Many researchers are now using the hospital for case studies due to huge amount of accurate patient's data being generated.

The staff is more proactive and productive in the discharge of their duties.

Safety of data is ensured and control of its use: EMR has also helped in research and planning purposes through data collections especially in drug provisions and other things.

Medical error has been greatly reduced: The hospital is now less exposed to legal actions from patients and their relations since information about patients are properly documented on the EMR platform.

EMR has also reduced patients waiting time: In the past, patients usually wait for longer hours waiting for the record officer to retrieve their case notes before they would be able to see doctors. With the EMR in place, it takes just seconds for the patient's information to be retrieved and sent to the doctors.

Challenges Encountered

While the benefits of implementing an EMR system are important, it has not been without significant challenges. The challenges encountered in the course of implementing the EMR system are both technical and human in nature.

EMR Application Downtime: The application fluctuates sometimes and the signal strength may be slow, weak or not available at all. When this happens, it slow down the work process of the application.

Power outage: Electricity can go off unexpectedly. This challenge usually affects the application by stopping it abruptly. However, UPS, inverters, Solar panels, and big generators are put in place to curb the effect.

Staff Attitudes: Most of the staff was not prepared to use the EMR despite the training they received on the new system. This was mainly because majority of the staff are not computer literate and feeling comfortable with the system takes time. Librarians were able to work with the staff to overcome their reticence and continue to teach the staff the use of computers and computer appreciation.

Insufficient Manpower: There was not enough ICT staff to be deployed to various clinics, wards and departments for assistance. Few ICT staff was available to work on night duty. This issue was a challenge to the hospital because only few ICT staff were on ground to attend to all the wards and clinics in the hospital.

Patients' Overflow: The hospital had too many patients to handle at the same time. Most of the patients were impatient and irritable during the implementation process of the EMR.

Thunder strike was another great encounter which the hospital experienced after few years of introduction. This affected the server room and the EMR operations. However, there was quick intervention of the ICT Engineers and experts to restore and rectify the affected equipment.

Cost: The EMR program is a huge capital-intensive project which therefore needs to be planned and budgeted for before embarking on it.

Conclusion

The introduction and implementation of Electronic Medical Records (EMR) in the Federal Medical Centre, Ebute-Metta, Lagos was an important development in the history of the hospital. EMR has significantly improved the quality of healthcare services when compared to the manual methods by enabling all the health care providers to perform their duties efficiently and effectively in the management of patients and patient records. It has greatly reduced the stress of doing paper work and also reduced patients waiting time. Finally, more revenue is now being generated which can be used for the maintenance of the hospital facilities.

Recommendations

The following are recommended for successful sustenance of the EMR at the Federal Medical

Centre, Ebute-Metta, Lagos, and similar institutions:

1. Initial and ongoing staff training is required: The staff of the hospital needs to be trained and re-trained in order for them to perform efficiently and effectively on the EMR platform.
2. The software in use must be durable, reliable and have a long lifespan.
3. The software in use should have measure for stability and the capacity of being updated regularly. This will enable the hospital to be able to accommodate more patients that are increasing on daily basis.
4. More staff should be employed to cover every unit effectively. Professionals in various required fields needs to be given appointments for the EMR sustainability. As more staff are retiring from service, new ones are trained to continue the trend.
5. Generators, UPS, Solar panels, and inverters in use should be serviced regularly and be replaced when necessary.
6. Regular update of patients' information is necessary.
7. Thunder protection gadgets should be installed to forestall future occurrence.
8. There should be a Backup plan for patients' databases. The backup of patients database is necessary to avoid eventuality.

Bibliography

Bilimoria, K. Y., Chung, J. W., Minami, C. A., Sohn, M.-W., Pavey, E. S., Holl, J. L., & Mello, M. M. (2017). Relationship Between State Malpractice Environment and Quality of Health Care in the United States. The Joint Commission Journal on Quality and Patient Safety, 43(5), 241–250. https://doi.org/10.1016/j.jcjq.2017.02.004

Federal Medical centre, Ebute-Metta, Lagos. Background of the Hospital. https://fmceb.org/

Naeem, M. & Alquasimi, I. (2020). Unfolding and Addressing the Issues of Electronic Medical Record Implementation: Evidence from Public Sector Hospitals. Information Resources Management Journal, 33(3). https://www.researchgate.net/publication/343146763

National Cancer Institute Dictionary of Cancer Terms/ Electronic Medical Record. https://www.cancer.gov/publications/dictionaries/cancer-terms/def/electronic-medical-record.

Ngurah, G., Dharma, A., Sukadarmika, G. & Pramaita, N. (2022). Application of DeLone and McLean Methods to Determine Supporting Factors for the Successful Implementation of Electronic Medical Records at Bali Mandara Eye Hospital. Journal of Applied Science, Engineering, Technology, and Education, 4(2). https://doi.org/10.35877/454RI.asci1287

Ohuabunwa E.C., Sun J., Jubanyik K.J., Wallis L.A. (2016). Electronic medical records in low to middle income countries: the case of Khayelitsha Hospital, South Africa. Afr J Emerg Med, 6.38-43.

Ramadhani J.M., Brittany M., Upendo G., Natalia L., Juma M., Hendry S., and Libby W. (2019). Implementation of electronic medical records at an Emergency Medicine Department in Tanzania: The information technology perspective. Afr J Emerg Med, 9(4), 165–171. https://doi.org/10.1016/j.afjem.2019.07.002

University of South Florida Health. https://www.usfhealthonline.com/resources/key-concepts/what-are-electronic-medical-records-emr/|