Texila International Journal of Public Health
Special Edition Dec 2019

Issues Surrounding Adoption of Electronic Health Records in the Zambia Defence Force: A Case Study of Kalewa Urban Health Centre

Article by Andrew Silwamba
Texila Amerian University
E-mail: vundu003@gmail.com

Abstract

The objective of the study was to assess the effectiveness of the Electronic Health Records system (EHR) and the level of adoption by health facility personnel.

This study was conducted between January and June, 2019 at Kalewa Urban Health Center in Ndola, Zambia. This was a pilot secondary case study before EHRs could be rolled out to other facilities. Fifty-six (n=56) representing 94.9% of facility staff.

06 (10.7%) had previously been using EHRs in HIV Clinic before the training under review. 44 (78.6%) of respondents preferred e-first based practice while 12 (21.4%) preferred e-last based practice. 51 (91%) respondents argued that it was not possible to do away with paper-based practice. 38 (67.9%) respondents agreed that members of the community appreciated EHRs use.

The advantages associated with use of EHRs were appreciated by every health worker. Each service point had personnel trained with emphasis to the role each department plays at the facility. The study produced positive results and recommendations would be used to ensure that use of EHRs produced the desired results. The experiences of Kalewa Urban Health Center would be useful as the program is extended to other Defence Force facilities.

Keywords: *Electronic Health Records, Defence Force, Logistics Management Information System, Health Management Information Systems, SmartCare.*

Introduction

Projects on developing Electronic Health Record (EHR) systems have been carried out in many countries of the world. Findings have showed that open source EHRs have been wildly used by source limited regions in all continents, especially in Sub-Saharan Africa and South America. Zambia is using a form of EHR called SmartCare. The system was initially introduced to in the management of HIV and associated diseases. Defence Force facilities in Zambia are not an exception to this development since they operate under the Ministry of Health guidelines in health care service provision.

According to a study by *Farzaneh Aminpour et al*, approximately 23.9% of physicians used EHR in the United States of America in the ambulatory setting and only 5% of hospitals used Computerized Physician Order Entry (CPOE) through 2005. A study on the levels of EHR adoption in USA revealed that only few US hospitals had a comprehensive electronic clinical information system and many others only had parts of an electronic records system. It seems that financial support, interoperability and training of information technology support staff by policy makers is necessary for increasing the application of EHR in US hospitals.

Since the late 1970s, U.S. Department of Veterans Affairs (VA) as a governmental sector advanced their efforts to develop an extensive organizational health information system named veterans' health information systems and technology architecture (VistA). VistA uses Massachusetts general hospital utility multi-programming system (MUMPS) a program that can be used for disease case registries. Only a few major organizations in the private sector worked on the implementation of EHRs in USA. A study was conducted for sub Saharan Africa by *Florence Femi Odekunle et al* which established that poor health information system was identified as a major challenge in the health-care system in many developing countries including sub-Saharan African countries. Electronic health record (EHR) proved to be an important tool to improve access to patient information with attendance improved quality of care. However, EHR has not been widely implemented/adopted in sub-Saharan Africa.

DOI: 10.21522/TIJPH.2013.SE.19.02.Art013
ISSN: 2520-3134

The available evidence indicated that there were many factors that hindered the widespread adoption of an EHR in sub-Saharan Africa. These were high costs of procurement and maintenance of the EHR system, lack of financial incentives and priorities, poor electricity supply and internet connectivity, and primary user's limited computer skills. Smart-care was developed to meet the needs of the Ministry of Health in the care of HIV patients, taking into consideration, the level of infrastructure development in the health sector in Zambia (CDC, 2010). In 2006, following two years of successful pilot tests, MOH (2012) approved smart-care as the sole electronic medical record to be used for public and private health care in Zambia.

The main aim of the smart-care program is to link up services for HIV clients and improve access to health information regardless of location, thereby, reducing delays in initiation of treatment, duplication of investigations, risks and errors, expenses and improving HIV data standards, security and confidentiality in the country (Neame, 2013). Neame (2013) argues that storing health records using information technology (IT) improves the sharing of patient data among healthcare providers, a factor MOH thought could improve quality of care for HIV patients. (Keith Mweebo, 2014). SmartCare in the Defence Forces of Zambia health facilities was designed to provide continuation of care to clients. This has improved the quality of care since the health providers have comprehensive information of the client's past history.

Since there is no need to enter client's basic information more than once, it has helped reduce congestion at health facility. EHRs have been in use in most health facilities for close to 10 years. Its use has mostly been confined to the area of HIV and Maternal and Child Health. With support from FHI 360, Defence Force Medical Services was rolling out use of EHRs to all departments of health care in all Defence Force health facilities.

With the increase in computer use due to the reduced cost of computers and associated appliances, rolling out the use of EHR to other departments and service provision points should pose little or no challenges. No similar study has been conducted in the Zambia Defence Forces. The EHR program in the Defence Forces of Zambia is supported by Family Health International (FHI) funding from PEPFAR. I was part of the team involved in the training of facility personnel in EHR use. It was a perfect study to undertake as it is useful in all the three study areas namely Non-Communicable Diseases, Environmental Health and Public Health Informatics.

Materials and methods

Study setting

The study was conducted at a Defence Force health facility in Ndola. The characteristics of this facility is similar in all areas to other health facilities in which EHRs are intended to rolled out to. The health workers at this facility are predominantly military personnel with most civilian workers being community health volunteers living within the vicinity of the military cantonment. The health facility offers health services to the military community and surrounding populations. The facility does not have a well-defined population due to its urban location but attends to 25,000 clients per year. This study was undertaken within the facility premises.

Study population

A hands-on study was conducted with respondents being health workers who attended an onsite SmartCare training. These health workers represented all departments at the facility from full time workers to volunteers. Interviews were restricted to health facility workers and some clients who had come for some form of service.

Sample size determination

Sample size was calculated with consideration of the general teaching of sample size minimum of not below 30%. All those trained in SmartCare/EHRs use needed to provide feedback. 56 out of 59 facility health workers were respondents representing 94.9% sample size.

Sampling technique

A stratified sampling technique was adopted to select sample. Only those who underwent SmartCare training were selected. Respondents were selected from each department of the facility. These departments acted as strata. Simple structured questionnaires were distributed to all respondents.

Study tool

A semi structured questionnaire was used. It sought to assess the challenges associated with use of EHRs and recommend solutions. It was also aimed at assessing acceptability of EHRs by users. The tool was meant to help assessors establish the challenges which were within the means of the health workers to control and those which needed higher authorities' intervention. Some information was collected by observation.

Ethical consideration

This study is not only for academic purposes but also to help the local healthy facility, Defence Force Medical services and partners (FHI 360) assess the challenges that would be faced in implementing EHRs in Defence Force facilities and make recommendations on how they could be handled.

As a representative of the Defence Force Medical Services, the study was a benchmark for assessment of performance needs of Defence facilities in Zambia. It was done with the authority of District Health Office and Defence Force Medical Services. A verbal consent was obtained from respondents who came as clients prior to the interview. For facility staff, it was done as a routine task. There was no need for consent from respondents as this study was needed to assess their competence for facility accreditation by the Health Professions of Zambia.

Data analysis

Qualitative data were described as numbers and percentages. Data was gathered by use of a questionnaire and content was analyzed descriptively and interpretatively by use of tables, charts, diagrams and graphs.

Findings and results

There were 59 health care workers present at the facility, 56 of whom were trained in SmartCare representing 94.9%. Questionnaires were distributed to 56 trained staff (n=56) representing. All the trained members of staff gave feedback representing 100% response rate. All respondents agreed that SmartCare had improved service provision.

Of the 56 trained respondents, 06 (10 %) had been using SmartCare in ART even before the training under review. 44 (78.6%) of respondents preferred e-first based practice while 12 (21.4%) preferred e-last based practice. 51 (91%) respondents argued that it was not possible to do away with paper-based practice. 38 (67.9%) respondents agreed that members of the community appreciated EHRs use.

Table 1. Distribution of trained personnel by department/service point

Registry /Data	OPD	IPD	Lab	Dental	MCH	HIV Services	Community Services	Env. Health	Pharmacy
06	06	08	04	01	10	10	05	03	02
10.7%	10.7%	14.3%	7.1%	1.8%	17.9%	17.9%	8.9%	5.4%	3.6%

The table above demonstrated that all departments of the health facility were represented. The training was targeted at all facility workers. Those found not to be trained were out at the time the training was being conducted.

DOI: 10.21522/TIJPH.2013.SE.19.02.Art013
ISSN: 2520-3134

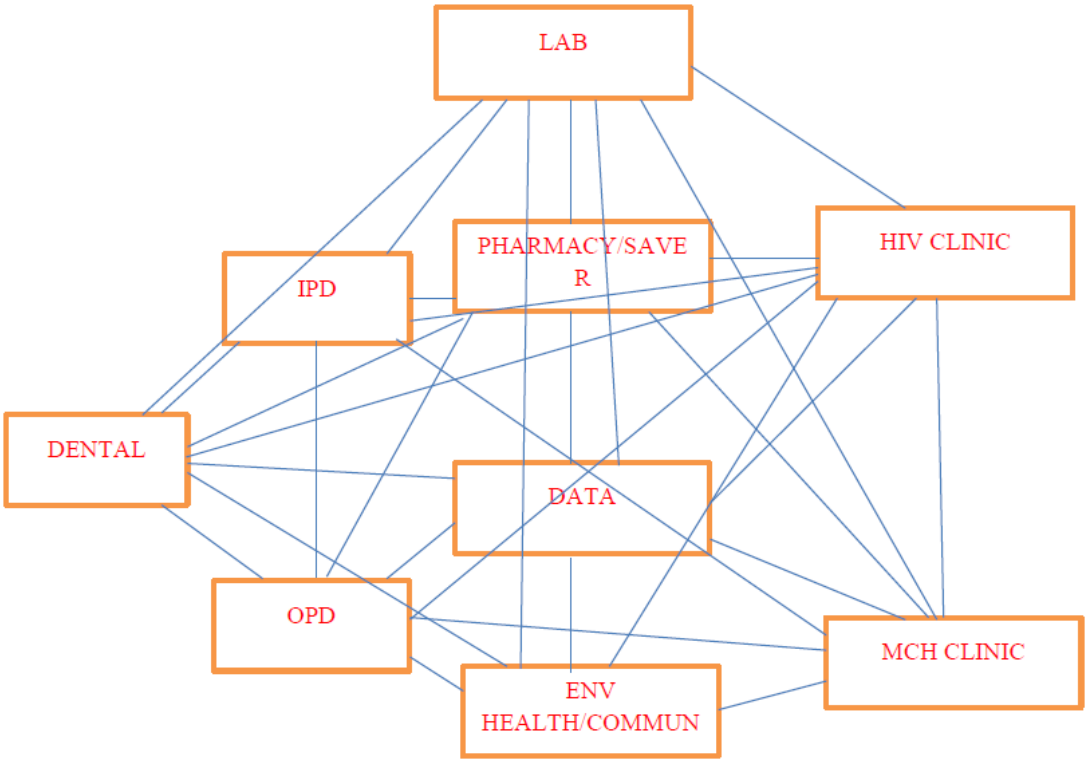

Figure. 1. The health services web

The above diagram is a depiction of a layout of Kalewa Urban Health Center. It shows how EHRs have brought services closer to all providers regardless of the department. A clinician from OPD for example does not need to walk to his department when he is at the pharmacy to make a clarification on anything. He just has to login to his account and provide advice. Equally, a client does not need to make another registration if he seeks services on another visit at another service point. The web means that all service points or departments are interlinked.

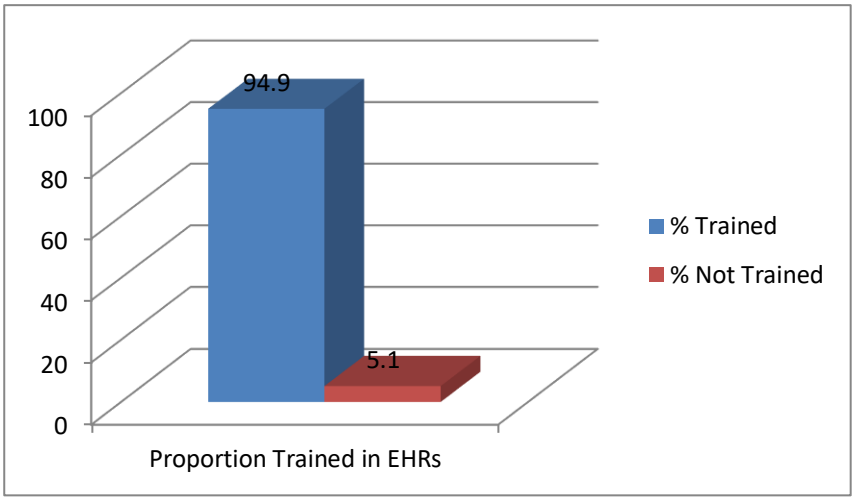

Figure 2. Proportion of health workers trained

94.9% of respondents were trained in use of EHRs. There was representation from all service points. Each service point had a minimum of 02 people which means that there was always someone to use EHRs in the case where one is committed. 10% of the respondents had been using EHRs even before the training under review. They were familiar with basics of EHRs use. They only needed to be familiarized with EHRs use in other service points such as Outpatient and Inpatient. They were familiar with issues of report generation.

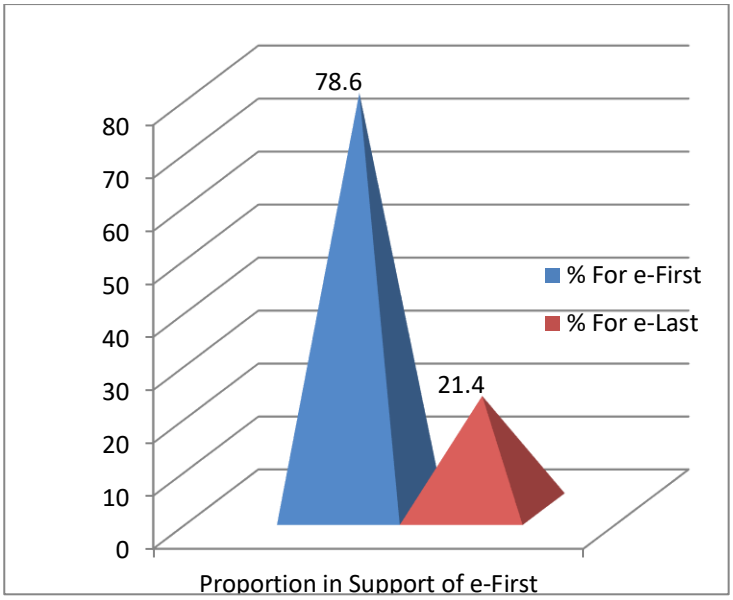

Figure 3. Proportion in support of e-first

The training was emphasizing on e-first based practice. This means that data would be entered on electronic gadgets or computers and later transferred on paper at the end of the day's work. 78.6% preferred e-First while 21.4 % preferred e-Last. They supported e-First because they needed to save client information on the client card. They also said that EHRs had the capability to alert the health care provider in case of any abnormality such as the rise in blood pressure, the rise in temperature, below or above normal BMI among others. They said EHRs made it easier to identify Non communicable diseases early and made interventions quicker. Those who favored e-Last said that it too long for them to complete an interaction due to limited computer skills. They therefore preferred to enter client information at the end of the day when they had enough time for themselves.

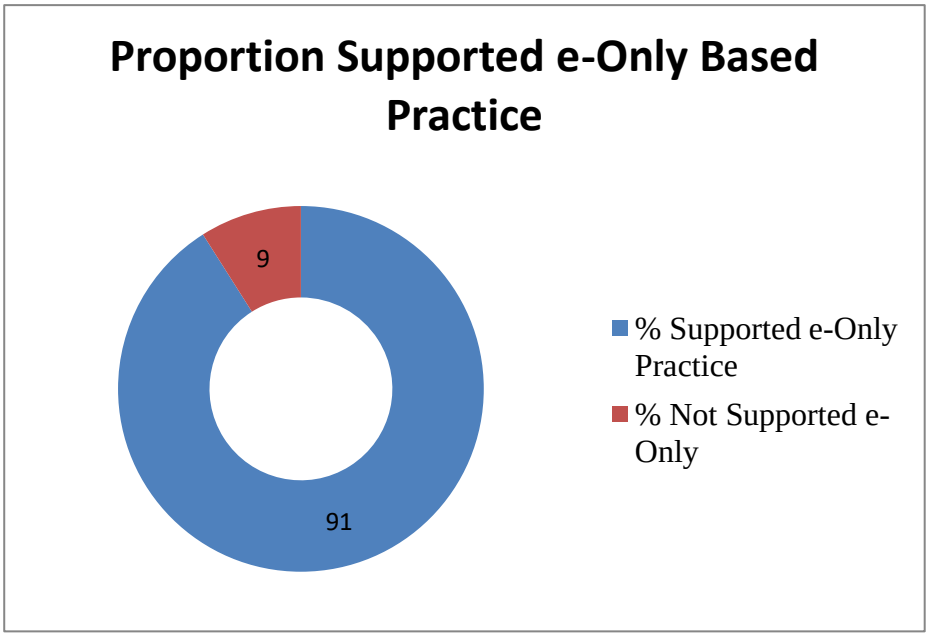

Figure. 4. Proportion supported e-only based practice

91% of respondents said that it was not possible to do away completely with paper-based practice. They said that power outages made use of EHRs not completely reliable. They also experienced occasional equipment problems and they had to wait for experts from partners to come and rectify the problems. This sometimes took few days. Those in support of completely doing away with paper-

DOI: 10.21522/TIJPH.2013.SE.19.02.Art013
ISSN: 2520-3134

based practice said that the Defence Forces had the capacity to provide backup sources of power such as generators and solar power.

They said that the Defence Forces had trained IT personnel from within the Units who could be trained in handling EHRs so that they could be deployed at the health facility to offer technical support in terms of IT.

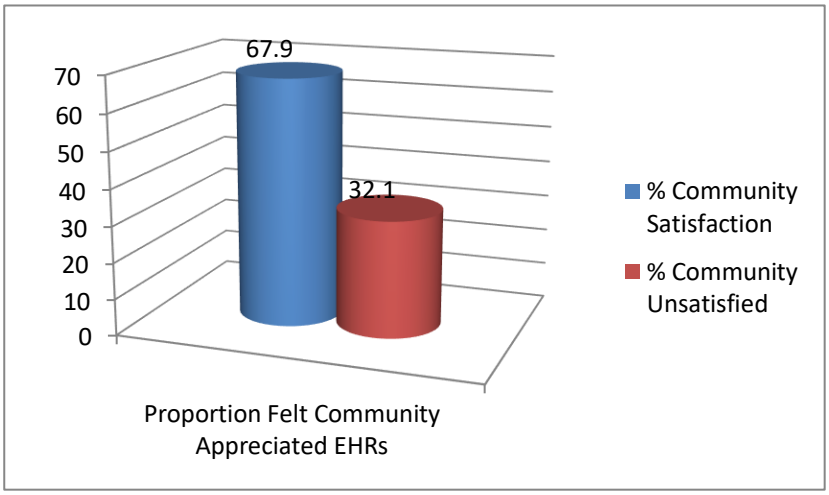

Figure 5. Proportion felt community appreciated EHRs

Respondents were asked if they felt members of the community appreciated the EHRs introduction. 67.9% said that they felt community members appreciated the EHRs' introduction. They said this because some members of the community visited the facility to get the client card in advance. Clients also said that looking for books was taking too long. They also said that complaints about first come first serve were no more at the lab and pharmacy.

Discussion

In the Defence Force facilities, SmartCare is meant to provide continuation of care to clients. Clients are now able to receive any health care service at any facility without necessarily going back to their facility of origin. This has improved the quality of care since the health providers have comprehensive information of the client's past history. Since there is no need to enter client's basic information more than once, it has helped reduce congestion at health facility.

Recommendations

1. To prevent use of SmartCare computer for unintended purposes, USB ports should be restricted on all computers except at points where card readers are needed for saving of client information on the Smart card.
2. Request for IT personnel to be attached to the health facility should be made to Unit Command so that technical issues related to IT can be handled quickly.
3. Use of experienced users of SmartCare as mentors should be considered by facility supervisors.
4. Procuring of generators and solar equipment should be considered by Defence Force Medical Services through various Branches.
5. Regular technical support visits should be done preferably quarterly to ensure that problems are identified and sorted out in time.

Conclusion

The pilot study carried out at Kalewa Urban Health Center was the first of its kind. It provided a starting point for rolling out SmartCare use in all Defence Force Health Facilities. All service points had more than one person trained which would ensure continuity. The restriction of access rights limited to the service each person provides would promote confidentiality and restrict abuse of equipment.

The findings and recommendations of this study will be used to ensure that use of EHRs produces the desired results. The experiences of Kalewa Urban Health Center would be useful as the program is rolled out to other Defence Force facilities.

References

[1]. Ramesh Krishnamurthy and Dr. David Novillo-Ortiz, (2017). World Health Organization (WHO) and Pan American Health Organization (PAHO/WHO). Handbook for Electronic Health Records Implementation.

[2]. Farzaneh Aminpour et al, (2014 Jan). Utilization of open source electronic health record around the world: A systematic review. Retrieved 4:32, June 17, 2019 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3963324/.

[3]. Florence Femi Odekunle, Raphael Oluseun Odekunle and Srinivasan Shankar, (2017 Sep-Oct). Why sub-Saharan Africa lags in electronic health record adoption and possible strategies to increase its adoption in this region. Retrieved 15:11, June 17, 2019 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5654179/.

[4]. Keith Mweebo, (2014). Security of electronic health records in a resource limited setting: The case of smart-care electronic health record in Zambia. Retrieved 15:41, June 17, 2019 from https://pdfs.semanticscholar.org/3e3f/b3d870bc24f5f7b0daa03b16886024c03242.pdf.