The Use and Adoption of HIS and EMR in Botswana

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Abstract—Health Information Systems (HIS) strongly influence the quality and effectiveness of health care. Information management is very crucial in health care. Information is an asset for any institution and it has to be secured and managed for quality and effectiveness. Information Technology is the answer to health information management and security. The capabilities of Electronic Medical Record (EMR) systems are beneficial to improving healthcare service if the intended clinician fully utilizes them. Many countries have adopted HIS and Botswana has also joined them with the aim to obtain these benefits. In this study, the researchers’ aim is to find out the HIS strategies and plans for the Ministry of Health for Botswana and challenges immigrating from paper to paperless.

Keywords—Health Information Systems, Information Technology, Electronic Medical Record, Adoption, Migration

I. INTRODUCTION

Living in the Information Technology era, migrations from paper based medical record to electronic health record have been noticed worldwide. Health Information Systems (HIS) have been adopted by Ministries of Health or private hospitals and clinics, tertiary institutions in many countries yet the Ministry of Health (MOH) in Botswana is still using more of a paper based health record than the electronic health record. Botswana has committed herself to joining the trend of investing e-Health as a strategy to improve its health service delivery (Maitlamo: Botswana’s National ICT Policy, 2004) The Botswana medical record system, used countrywide, has proven to be an efficient and reliable means of maintaining documentation. Hermann Bussmann et al (2006) [1] This medical record system primarily uses paper-based, patient-held outpatient department (OPD) cards that contain all pertinent medical data, including outpatient visits, hospitalization summaries, specialist notes, prescriptions and diagnostic results, arranged in chronological order. The patients keep these cards. Patients may lose the cards or come to the next visit to the hospital without these cards for one reason or another. Most times patients will get a new card and there are no records about this patient in the clinic or hospital. The aim of this study is to find out what HIS are in use and the progress of Ministry of health as it strives to go paperless.

Problem Statement

In the public clinics and public hospitals in Botswana they still use paper records that the outpatient takes home. These records, patients lose them and most of them do not bring them back to the clinics when they go back for next visit to the clinics or hospitals. Most of the records in Ministry of Health are paper based records, which is outdated in the world today, not secure, requires more space to keep them, can be misplaced easily and its usually not easy to create a follow up on patient health history. This study is trying to find out what strategies and plans are in place for HIS and what challenges MOH Botswana has in migrating from paper based to paperless.

Purpose of the study

This study is trying to find out what strategies and plans are in place for HIS and what challenges MOH Botswana has in migrating from paper based to paperless.

Objectives of study

1. To find out what are the Health Information System strategies and plans for MOH Botswana
2. To find out those institutions that use open and free software e.g OpenMRS (Open Medical Records System)
3. To advocate for Open, free HIS which can be made custom to the needs of the institution to avoid too much cost.
4. To find out if there are any challenges for migration from paper to paperless

Significance of the study

This study is very important because Health information systems (HIS) have become one of the most challenging and promising fields of research, education and practice for medical informatics, with significant benefits to medicine and health care in general

Research Questions
1. What are the HIS that MOH Botswana has started using and which hospital institutions and why?
2. What are the challenges MOH Botswana is facing to migrate from paper to paperless?
3. What are the MOH Botswana HIS strategies and plans for the future?
4. Which public health institutions use open and free HIS, for example, OpenMRS in Botswana

II. LITERATURE REVIEW

The HIS is here to increase life expectancy significantly higher than it would have been even some few decades ago. In the developed world where HIS are used it has been found that HIS enhances progress leading to aging societies, and it is of influence to the organization of health care. There are different lines of development for HIS we would like to know which line of development is suitable for which institution in Botswana. We would also want to know about consequences for health information systems in the future of Botswana?

The following lines of development for HIS were considered as important in this study: (1) the shift from paper-based to computer-based processing and storage (the Electronic Health Record), as well as the increase of data in health care settings; (2) the shift from institution-centered departmental and, later, hospital information systems towards regional and global HIS; (3) the inclusion of patients and health consumers as HIS users, besides health care professionals and administrators; (4) the use of HIS data not only for patient care and administrative purposes, but also for health care planning as well as clinical and epidemiological research; Migration from paper based health records to electronic health records began in 2013 when Assistant Minister of Health Mr. Matlhabaphiri introduced Integrated Patient Management System (IPMS) technology in major hospitals across the country. According to Daily News (2013) it is stated that “With this initiative, going paperless is no longer a dream but a possibility within reach,” Mr. Matlhabaphiri said. According to George Muyunda (2016) Zambia Leads the Way in Smart Care Electronic Health Records System. The system has been installed in all 9 districts which include over 550 clinics. In other parts of the world outside Africa, the countries with the highest electronic health record rates according to Becker’s Health IT & CIO Review (2013) are Norway 98%, Netherlands 98%, United Kingdom 97%, New Zealand 97%, Australia 92%, Germany 82%, United States 69%, France 67%, Canada 56%. There are many benefits for using HIS and these benefits were findings of a study done by Bates et al. (1998)[2] who compared medical errors before and after physician order system was introduced, where he found that physician order entry system could reduce prescription errors by more than half. In another study by Bates et al. (1999)[3] investigated prescription errors after decision support systems were implemented. This addition had favourable results, e.g., “non missed dose errors” were reduced by more than 80% in their study. It was very difficult to find research about health information systems adoption and usage in Botswana. HIS are very important; there is a benefit and a financial gain to be realized after implementation of these systems. These Systems could improve quality of care and reduce errors by allowing electronic transmission to external providers, decision support and drug interaction, or contra-indication prompts.

III. RESEARCH DESIGN AND METHODOLOGY

In this research we used a survey study. A physical investigation of data and the resources were be done. Interviews were conducted to administrators for information in health institutions. A questionnaire was designed for data collection.

What methods we are using

The data collection method will employ a self administered survey tool which will allow for acquisition of a sizeable amount of quantitative data from a selected group of respondents, in a short period of time.

Sampling

In Gaborone city there are three main Hospitals namely, Princess Marina Hospital, Bokamoso Hospital and Gaborone Private Hospital. We visited all three hospitals and interviewed them and gave them questionnaires. Then there are many public clinics and many private clinics. An investigation was also done at the ministry of health(MOH). Appropriate officers were also interviewed. Sampling was done by making a list of all public clinics and private clinics. At least 60% of the population of clinics was under investigation. The main towns were targeted for investigation. All in all 14 towns were investigated. In each Town 2 to 3 public clinics and 2 to 3 private clinics were investigated and a hospital if it is there. We show all hospitals in Botswana under investigation in this research.

See appendix 1

Quantitative Research

We conducted a Quantitative research using a statistical package named Epi Info. This package sets up a database of records and you can create a questionnaire that can be saved in the database and editable. Also if helps you to do the statistics and produce reports for the data collected making comparisons with the records. We then make theoretical interpretations of the data collected.

Data Collection

The research tools we used are the interview questions and the questionnaires. We collected data from the sample clinics and hospitals and also from MOH

A. Interview questions for MOH

1. What are the strategies and plans for the ministry of health on Health Information systems
2. What are the HIS used in public health institutions and why?
3. Which health institutions are using the HIS?
4. What are the challenges MOH in Botswana is facing to implement the HIS in every public hospital and public clinic

**B. Questionnaire questions for Health institutions**

1. Are you using any HIS in your institution? Yes/No. IF not why?
2. What HIS are you using?
3. Are you aware about the benefits of HIS? Yes or No
4. Do you want to know more about the benefits of OpenMRS (its an Electronic Record system) yes or NO

**IV. Data Analysis and Discussions**

In this chapter we will show data collected that was analysed and also we will show the results. We used Epi Info statistical package to store and analyze the data. In our investigations it was found out that the MOH has a strategic plan for Health Integrated Health Service Plan: 2010-2020, here below are some of the standards from this strategic plan.

Standards and procedures for information and communication management will be developed and updated annually by the Health Management Information Unit of the M&E Division will guide users in the management of both hardware and software.

**Challenges with MOH**

1. There are some gaps in systems including human capacity and infrastructure. We found out in some institutions that officers who were handling the medical records were not skilled. They did not know how to store the records properly. Most records or files were not easy to find when the doctors are looking for them. In some hospitals and clinics there is hardware and the system like IPMS is installed and running but its not being used fully. In some the systems are used 10% in some 20%, 30%, 40%, 50%, 60% or so but not 100% utilization.

2. Although MOH established a regulatory framework, that is, norms, Standards, operation procedures, policy, directives and laws to ensure that all data is collected there is still a problem where private institutions are not willing to share data for their patients.

3. There is no uniformity in public institutions as to whether they use the HIS or not. Some have no skilled people to use the HIS provided.

4. There are no Centralized Medical Records departments in most hospitals and clinics where all records are managed efficiently. In some hospitals it was found out they have just one small room where they keep records files and at the same time records officers desk doing the work. This creates a problem of space and efficiency. The results of the frequency of use of the HIS show that some clinics or hospitals hardly used the HIS they had and some used them not frequently. This shows that the HIS was under-utilized and therefore there were not used efficiently.

<table>
<thead>
<tr>
<th>Health Institutions</th>
<th>What is the name of your health institution?</th>
<th>IPMS?</th>
<th>Any other HIS?</th>
<th>HIS USAGE frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thamaga Primary Hospital</td>
<td>YES</td>
<td></td>
<td>Everyday</td>
</tr>
<tr>
<td>2</td>
<td>Mabutsane DHMT</td>
<td>NO</td>
<td>DHI S</td>
<td>Everyday</td>
</tr>
<tr>
<td>3</td>
<td>Kanye Adventist Hospital</td>
<td>NO</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>4</td>
<td>Health Scope Medical Center</td>
<td>YES</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mahalapye Hospital</td>
<td>YES</td>
<td></td>
<td>Everyday</td>
</tr>
<tr>
<td>6</td>
<td>Tsabong Primary Hospital</td>
<td>Yes</td>
<td></td>
<td>24hrs a day</td>
</tr>
<tr>
<td>7</td>
<td>Ramotswa Bamalete Hospital</td>
<td>YES</td>
<td>other</td>
<td>everyday</td>
</tr>
</tbody>
</table>

This table show the results of the frequency of use of the HIS. Some clinics or hospitals hardly used the HIS they had and some used them not frequently. This shows that the HIS was under-utilized and therefore there were not used efficiently. Table 1 also shows some hospitals and clinics which did not have HIS and also those who were not using IPMS but used different kinds of HIS.
Figure 1: The pie shows that in our findings there were more than 70% institutions who did not have a medical record department. There is a danger of misfiling and more time taken to look for files in this situation. Sometimes if departments keep their own patient files there is a problem of limited space and disintegration.

V. CONCLUSION AND RECOMMENDATIONS

The systematic processing of information by a HIS contributes to high-quality patient care, and reduces costs. This study has proved how this is true and also proved that open free software like OpenMRS will benefit the Health clinics and hospitals whether they are private or public organizations’ of Botswana. Some may need to be updated but some systems may need to be further developed and tailored according to the needs of the organization and they can be integrated with other systems. To reduce the cost of HIS which maybe billions and increase the effectiveness of HIS we recommend that MOH should use the open free software.

References