PERCEPTIONS OF MZUZU UNIVERSITY FINAL YEAR NURSING STUDENTS ON THE HEALTH INFORMATION SYSTEMS IN MALAWIAN HOSPITALS

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ABSTRACT: *This study explored perceptions of Mzuzu University final year nursing students on the health information systems in Malawian hospitals. The study used a qualitative approach in which a focus group discussion was conducted with 15 student nurses. Data was analysed thematically according to objectives of the study. Findings revealed that student nurses had pre-requisite knowledge to enable them to use Health Information System (HIS) in Malawian hospitals, however not all hospitals allowed student nurses to use HIS. For those that used HIS, the study found that HIS improved communication; finding of remedies to clinical problems; bringing treatment on time, and there is continuity in delivering healthcare to patients; enables collaboration among hospital departments; minimizes errors in medication administration; and leads to better clinical diagnosis of patients. The study also revealed some challenges with HIS in hospitals that included network problems which affects the efficiency of patients' care; inadequate and/or non-functioning computers (hardware); lack of training on how to use computers; high costs of maintaining the technologies; poor network infrastructure; poor Internet connectivity; and financial constraints. The study recommends that all hospitals should allow student nurses to use HIS since it is the tool they will use after graduation; all hospital departments should be linked through HIS to ensure that healthcare providers communicate efficiently for problem solving and finally all hospitals should have alternative power supply to enable HIS to function even when there are power outages.*

KEYWORDS: *health information system, student nurses, Malawian hospitals.*

INTRODUCTION

A Health Information System (HIS) is the intersection between the healthcare's business process and information systems to deliver better healthcare services Almunawar and Anshari (2012, 1). HIS provides the foundation for decision making in the health sector and comprises four key functions namely data generation, compilation, analysis and synthesis, and communication and use WHO (2008, 2). HIS gathers data from the health sector and other allied sectors, analyses the data and ensures their overall quality, relevance and timeliness, and converts data into information for health-related decision-making WHO (2008, 2) HIS plays a key role in hospitals in reducing medical errors, supplying health personnel increased patient care, and enhancing patient care quality Almunawar and Anshari (2012, 4). Hospitals with HIS can improve on the quality of care and cost by improving communication, making knowledge more readily accessible and improving hospital operations and services.

It is noteworthy that in today's world, the success of HIS relies on user satisfaction. Amongst these end-users of HIS in hospitals are nurses and midwives. These are probably the largest group of personnel who use HIS and among the nurses are student nurses and midwives. Student nurses form a part of this group of health care personnel who utilise HIS in the hospitals on a daily basis.

According to Hansen (2006, 2), students in nursing schools are requested to demonstrate technological skills and associated knowledge and elementary computer skills which include: Microsoft Word, presentation application (e.g. PowerPoint), Web-based search techniques (e.g. Medline), spreadsheets (e.g. Excel), databases (e.g. Access), and statistical programmes (e.g. SPSS). Nevertheless, some students still lack computer skills and Information Technology (IT) skills due to inadequate training in Information and Communication Technology (ICT). An action research study by Gonen, Sharin and Lev-Ari (2016, 5-6) that explored the integration of information technology competences into academic nursing education in Israel examined nursing students' knowledge in computer-based programmes such as Word, Power Point, Excel, Outlook, email, Facebook, Moodle, surfing the Web, using computerized information bases, and different software. Results showed that students had most knowledge in Word, Moodle (which was the college's information platform) and general surfing of the Web. These skills are pre-requisite knowledge for one to use technology like HIS. A national survey study by Hansen (2006, 2) which examined nursing students' attitudes towards technology in the United States of American indicated that student nurses had a positive attitude towards technology; however, there was no formal education that was provided to them on the use of technological applications. Therefore, the study recommended that this problem could be addressed through adding technological courses in the nursing core curriculum.

A qualitative exploratory study by Ndifoni, Edwards, and Halawi (2016, 193) examined the impact of Electronic Health Records (EHR) on patients in the United States (US) and reported that by deploying electronic health record keeping at Mount Sinai Medical Centre in New York, the centre got a range of positive results. Initially, there was continuity of care, improved communication among care givers, patients' access to prescriptions, appointment and test results. The study further observed that EHR simplified the work of nursing and led to more suitable referrals to subsidiary departments, and that using EHR led to more than 25 per cent of patients' information being imported from a previous encounter thereby eliminating duplicate documentation. With the EHR, the Clinical Decision Support (CDS) system in place at the hospital was able to document 100 per cent of all medications, and as a result, many preventable medication errors were avoided. A study that adopted a mixed method approach by D'Agostino et al. (2013, 331-332) conducted using a focus group discussion with 38 nurses; they expressed predominantly negative experiences to the Clinical Nursing Information System (CNIS) since it was not able to capture "real nursing". It was found to be difficult to use and did not improve neither their clinical practice nor patient care, however, when the same study was replicated using in-depth interviews with 39 nurses, it was discovered that the CNIS improved their knowledge, experience and judgment with respect to patient care. The results of the first study could have been due to the negative attitude at first encounter with the system. A negative attitude can influence results in the opposite direction but later after change of attitude and having understood the system, positive results were found. In Kenya, Waithera, Muhia and Songole (2017, 6) conducted a cross-sectional qualitative study that investigated the impact of electronic medical records on healthcare delivery in Kisii. The study revealed that EMR systems have led to increased productivity in the healthcare delivery, bringing about patient and provider satisfaction, better clinical decision making and better collaboration between healthcare providers.

The implementation of HIS in hospitals has not been smooth. Several authors Nyella (2011, 2-5); Heavin (2017, 2-4); Ahamadian et al. (2017, 4627) report some challenges that were faced in the implementation of this technology. Amongst these challenges include: cost, negative attitude of society towards using HIS, lack of hardware (e.g. computers) and network failure, no incentives to use the system, lower speed, personnel's unawareness, data privacy and security concerns, lack of interoperability between solutions, lack of professional guidelines for technology use, lack of integration, scarcity of resources, poor analysis of data, fragmentation at the higher levels, poor feedback and lack of motivation and limited information use. For example, Nyella (2011, 2-5) conducted a case study on the 'challenges in health information systems integration: Zanzibar Experience'. The study revealed that the implementation of the system experienced problems of integration which was attributed to donor policies that tended to support the implementation of disease specific HIS. Apart from this, a literature review study conducted by Heavin (2017, 2-4) in Ireland which sought to identify opportunities and challenges of HIS in global health revealed that there are a wide

range of health information systems applications that are available which makes choice difficult. Unlike the afore-mentioned studies, a quantitative study by Ahmadian et al. (2017, 4627) which looked at "Challenges of using HIS by nurses: comparing academic and non-academic hospitals in Iran" revealed mostly human and technological factors. In this study it was found that the "negative attitude of society toward using HIS" and "no incentive to use system" were among the human factors that hindered the implementation of HIS, and lastly lack of hardware and network failure were some of the technological factors that impeded the implementation of HIS in Kerman, Iran.

BACKGROUND INFORMATION

The study was conducted at Mzuzu University, Malawi. Mzuzu University is the second biggest public university which is located in the northern region of Malawi. Mzuzu University offers Nursing and Midwives training in the faculty of Health Sciences. Student nurses at Mzuzu University as all student nurses in Malawi spend approximately a better part of their education programme in a practical setting community which is referred to as the clinical area. The current curriculum requires that student nurses do clinical practice in the hospital settings. It is in these hospital settings that the students interact and use the HIS Management Systems during their practical attachments.

PROBLEM STATEMENT AND AIM OF THE STUDY

The use of ICTs in the healthcare system is the new paradigm shift that is sweeping across the globe. ICT applications in hospitals across the world all aim at improving efficiency and the effectiveness of healthcare delivery services. Health information systems that can record and locate important information quickly have become a standard practice in many healthcare organisations Almunawar and Anshari (2012, 2). Therefore, understanding and adopting HIS technologies are critical for health care services delivery, and for HIS implementation success. In Malawi, Central Hospitals are among the places where health information systems have been adopted and are being used to increase efficiency. However, studies to explore the perceptions and experiences of the health systems remain unexplored in Malawi, hence this study. This study aimed at exploring the final year Bachelor of Nursing and Midwifery students' perceptions and experiences on the effectiveness of the HIS in Malawian Hospitals.

OBJECTIVES

The study was guided by the following objectives, namely to:

- Explore knowledge and understanding of HIS by student nurses,
- Ascertain the impact of the system on the health care delivery; and
- Establish challenges faced in using the health information system.

METHODOLOGY

The study used a case study design and adopted a qualitative research method approach in which fifteen (15) final year nursing students at Mzuzu University were targeted. Semi-structured interviews and focus group discussions were used to collect data and the data were analysed thematically in accordance with the objectives of the study.

RESULTS AND DISCUSSION OF FINDINGS

This section presents the findings of this study from a focus group discussion that was conducted with 15 final year (Level 4) students pursuing the Bachelor of Nursing and Midwifery at Mzuzu University.

Knowledge and understanding of HIS by student nurses

Results from a focus group discussion with student nurses established that the majority of the student nurses had prior knowledge in the use of ICT applications like WhatsApp, Facebook, Email, Microsoft Word and PowerPoint. This shows that the students had prerequisite knowledge in computers to enable them use HIS effectively. These findings concur with an action research that was conducted by Gonen, Sharin and Lev-Ari (2016, 5-6) that explored the integration of information technology competences into academic nursing education in Israel. Results revealed that students had ample knowledge in Word, Moodle (which was the college's information platform) and general surfing of the Web. These skills are pre-requisite knowledge for one to use technology.

The student nurses were asked to mention the hospitals they were attached for clinical practice and which one of those hospitals used HIS. The statements below depict the situation:

> *"I have been attached to Queen Elisabeth Central Hospital, Mzuzu Central Hospital, Zomba Central Hospital, Mzimba District Hospital and all these use HIS."*

> *"I was attached to Nkhotakota District Hospital, Mzimba District Hospital, Mzuzu Central Hospital, Zomba Mental Central Hospital, and all the hospitals mentioned above use HIS."*

> *"I was attached to Queen Elisabeth Central Hospital, Mzimba District Hospital, Rumphi District Hospital, Kasungu District Hospital, Zomba Mental Hospital, and Zomba Central Hospital for my clinical practice. All these have and use HIS."*

To summarise the findings above, the central hospitals in Malawi and the majority of the district hospitals have, and are using HIS for managing patients' information. No government health centres or clinics were ever mentioned as having or using HIS. Furthermore, this study revealed that the majority of students used HIS in the hospitals they were attached to while a few students were not allowed to use HIS.

Impact of HIS on the health care delivery

During the focus group discussion, respondents were also asked about the noticeable impact that the HIS brings in Malawian hospitals. The following were comments that the majority of the students provided:

> *"HIS has brought a positive impact to both patient and ward management since the patient is able to be treated on time as care is being continued from where it stopped previously and the mortality rate has decreased"*

> *"Positively, HIS improves communication and finding solutions to clinical problems thus as a source of information for clinical diagnoses and management"*

> *"Minimises error, brought continuity of care and improved patient care since patient care is well documented, and it is easy to plan new interventions if the others fail"*

In summary with regards to the impact of HIS on patient care and ward management, this study has found that HIS has improved communication and finding remedies to clinical problems, it brings treatment on time and there is a sense of continuity, it enables collaboration among hospital departments, minimizes errors in medication administration, enables better clinical diagnosis of patients, no missing of patient results from x-rays and laboratories, and defaulters from ARVs are traced easily and others. These findings are supported by Ndifoni, Edwards and Halawi (2016, 193) who conducted a study on the impact of electronic health records on patients in the United States (US). The study revealed that with the use of electronic records system, there was an enhancement in the continuity of care, improved communication among care givers, and patient access to prescriptions, appointments and test results. Additionally, the study observed that the

EHR simplified the work of nursing and led to more suitable referrals to subsidiary departments, and as such, medication errors were avoided. The findings are consistent with Waithera, Muhia and Songole (2017, 6) who investigated the impact of electronic medical records on healthcare delivery in Kisii. The study revealed that EMR systems have led to increased productivity in the healthcare delivery, bringing about patient and provider satisfaction, better clinical decision making and better collaboration between healthcare providers.

Challenges with HIS in Malawian hospitals

Student nurses were also asked about the challenges that Malawian hospitals are facing with HIS. This is what most participants of the focus group discussions said:

> *"Although HIS has improved efficiency in hospitals that have implemented it, they still face challenges of poor infrastructure (inadequate computers, poor network and Internet), healthcare workers lack knowledge and skills on how to use HIS, lack of training opportunities and insufficient financial support to maintain the system"*

> *"Inadequate staff to do the collection and recording of all data generated in hospitals and gaps in the data make it difficult for the clerks to compile the required data hence they end up having incomplete data."*

> *"When there is no electricity or power, there are no alternatives, staff and patients have to wait until power is on which delays healthcare service delivery leading to customer dissatisfaction"*

In summary, the majority of the student nurses in the focus group were of the view that Malawian hospitals are challenged in their bid to use HIS because of network problems which affect the efficiency to provide patient care, inadequate or non-functioning computers (hardware), lack of training on how to use computers and as a result staff just abandon them, lack of knowledge on how to use HIS and its importance, maintenance of technologies is expensive, poor network infrastructure, poor Internet connectivity, financial constraints, lack of technical skills on operating the equipment, some of the machines need to be improved and maintained, and power outages.

A study by Ahmadian et al. (2017, 4627) on the challenges of using HIS by nurses in Iran revealed that factors that hindered the implementation of HIS included hardware and network failure. In the same vein, Kim, Coiera, and Magrabi (2017, 256) in a study that examined problems with health information technology and their effects on care delivery and patient outcomes in Australia established that health information technology faced a number of problems that included hardware (device) being down or slow, network/server down or slow, software not accessible, power failures, computer viruses, lack of staff training and delays in information transmission when there is a network/server problem. A study by Menachemi and Collum (2011, 51-52) on the benefits and drawbacks of electronic health record systems (HER) also supports the notion of implementation and maintenance costs. The study revealed that financial issues, including adoption and implementation costs, and ongoing maintenance costs affect the implementation and management of the EHR system since hardware must be replaced and software must be upgraded on a regular basis apart from the need to provide ongoing training and support for the end-users of an EHR.

CONCLUSION AND RECOMMENDATIONS

This study explored the final year Bachelor of Nursing and Midwifery students' perceptions and experiences of the effectiveness of the HIS in Malawian hospitals. It was a qualitative study that used focus group discussions and in-depth interviews to collect data. The study revealed that student nurses had pre-requisite knowledge to enable them to properly use Health Information System (HIS); however different hospitals gave different opportunities to the students to interact with HIS. For those that interacted with HIS, the study found that

HIS improved communication and finding of solutions to clinical problems, brings treatment on time, and that there is a sense of continuity, that it enables collaboration among hospital departments, minimizes errors in medication administration, provides better clinical diagnosis of patients, results in avoidance of missing of patients results from x-rays and laboratories, and defaulters from ARVs can be traced easily. The study also revealed some challenges with HIS in hospitals that include network problems, which affects the efficiency patient care; inadequate or non-functioning computers (hardware), lack of training on how to use computers which results in staff abandoning them, lack of knowledge on how to use HIS and its importance, the fact that the maintenance of technologies is expensive, poor network infrastructure, poor Internet connectivity, financial constraints, lack of technical skills on operating the equipment and some of the machines need to be improved and maintained, and power outages.

The study therefore recommends that all hospitals should allow student nurses to operate HIS since it is a tool they will use after graduation; all hospital departments should be linked through HIS to ensure that healthcare providers can communicate efficiently for problem solving, and finally all hospitals should have alternative power supplies in order to enable HIS accessibility even when there are power outages.

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