THE USE OF INTERNET FOR EVIDENCE-BASED MEDICAL PRACTICE IN BLANTYRE DISTRICT HOSPITALS

MSc (SCIENCE INFORMATICS) THESIS

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By

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DECLARATION

I, Chisomo Donald Kaundama, declare that this thesis titled: “The Use of Internet for Evidence-Based Medical Practice in Blantyre District Hospitals” is my original work and that it has not been presented and submitted to any other academic institution for a similar or any other degree award. Acknowledgment has been made where people’s work has been used.

CHISOMO DONALD KAUNDAMA

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Name of Candidate

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Signature

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Date

CERTIFICATE OF APPROVAL

The undersigned certify that they have read and approved that this thesis is the student's work and effort. The thesis has been submitted with their approval.

Signature: _____Date:_____

Benjamin Kumwenda, PhD (Senior Lecturer)

Main Supervisor

DEDICATION

Firstly, to God for His mighty works. Then to my wife, Ndaona; our son, Ebenezar and Juan; my mum and dad, my brothers and sister.

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To God be the glory for fulfilling His promises in my life.

Firstly, I would like to thank Dr. Benjamin Kumwenda for supervising and intellectually questioning my work tirelessly. Their guidance and contribution towards my thesis writing helped me to reach my goal.

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ABSTRACT

Use of Internet is becoming increasingly popular among health workers. Internet is the largest source of information in health systems that provides health professionals access to health information for Evidence Based Practice. Although the Internet is an important source of medical information used by various health providers, there is no literature on the Internet usage knowledge of health workers in Malawi. The aim of this study was to assess Internet usage, knowledge and practices among health workers for evidence-based practice. It extended to evaluate computer competencies among health workers; to determine pattern of Internet access and use; to identify barriers that affect use of Internet for clinical decision making and to investigate the effect of internet usage on provision of health services. This study found that majority of health workers regularly used Internet and Internet-based resources for both medical information search and personal use.

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CHAPTER 1

INTRODUCTION

1.1 Background

The world has witnessed an increase of Internet users for different purposes according to the report on world Internet development 2017 (WIC, 2017). The Internet is an extremely important new technology, and it is no surprise that it has received so much attention from different quotas (Zhang et al., 2015). For example, there was a dramatic increase in Internet utilization by users all over the globe; from one billion users in 2005 to three billion in 2015(Ahmad et al., 2018)

Recently the use of the Internet is becoming increasingly popular among health workers. Internet is the largest source of information in health systems that provides health professionals access to health information for Evidence-Based Practice. The world health organization is promoting the use of advanced and modern ways to provide health service delivery which includes Evidence-Based Practice(Jylhä et al., 2017). Evidence-based practice (EBP) is receiving considerable attention within the general field of human services and within the disciplinary literature of specific professions, such as medicine, psychiatry, psychology, social work, marital and family therapy, chiropractic, and nursing, among others (Legg, 2008).

Despite the advancement in Internet usage in the health sector and the importance of using Evidence-based Practice, very little was known on Internet usage for Evidenced Based Practice in the health sector, particularly in sub-Saharan Africa and Malawi was not exceptional. This study investigated how the Internet was used to enhance evidence-based practice in Malawi, particularly at Queen Elizabeth Central and Mwaiwathu Private Hospitals in Blantyre.

The Internet has become the driving force and source of information for daily life, including in health practice and service delivery. The use of the Internet has added value to most of the activities, resulting in efficiency in health service delivery but also reduction in costs. The health industry is one of the major users of the Internet, as evidenced by the increase in the frequency of accessing health-related online sites(Shortliffe, n.d.) Internet is a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information(*Shariful Islam and Nazmul Islam 2006 - Google Scholar*, n.d.). The Internet has created some new tactics on the globe, such as online education and eHealth. However, its greatest impact has been to enable the reconfiguration of existing practices that had been constrained by high costs for communicating, gathering information, or accomplishing transactions (Porter, 2001).

Many developing countries have embarked on strategies to utilize the Internet in generating and communicating of data from one level to another. However, many of these countries have managed to modernize the Health Management Information System (Simba & Mwangu, 2004b)

Internet is accessed through computers, smart phones, and tablets for searching information. For Internet to work there is a need to have good infrastructure, knowledge and administration skills.

Just like all other professionals, the health worker too, uses the Internet for research to find, store, process information and also for communication (Juwon, 2015). With the increase in population, limited infrastructure, and health care workers, some of the aspects of technology, such as the Internet, have become an important and cost-effective model of delivering health care services due to its ability to reach a large number of people in remote areas where access to health care services is limited (Ybarra & Eaton, 2005). Internet usage among health workers has increasingly grown because it provides up-to-date and easy access to clinical information which is used for clinical decision making (Pérez-Campos et al., 2014). Despite Internet usage for health service delivery, there are some negative factors (Morris-Docker et al., 2004)

Evidence-Based Practice (EBP) is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients (Sackett et al., 1996). Evidence-based approaches to clinical practice aim to deliver appropriate care efficiently to the patient (Titler, 2008). EBP results in quality patient outcomes when delivered in a context of caring supported by an organizational culture that supports EBP (Melnyk, et al., 2010). EBP is not just another highly advanced and extremely expensive western innovation, but an approach that can assist countries experiencing desperate health

situations to develop creative and innovative solutions that ultimately benefit patients(Jylhä et al., 2017)

Like many sub-Saharan and developing countries, Malawi has limited literature on the healthcare workers' use of the Internet for Evidence-Based Practice. Therefore, this study aims at assessing healthcare workers' usage of the Internet to improve their decision making and service delivery.

1.2 Problem Statement

The Internet has brought positive results to many organizations in a space of few years (Shortliffe, n.d.) And it is a key source of information for research, education, and healthcare service delivery. Some of the health delivery services have invested much on Internet for better service delivery. In the case of the Malawian health sector, there are huge investments made in Internet infrastructure such as magnetic resonance imaging (MRI) at Queen Elizabeth Central Hospital, video conference at College of Medicine, District Health Information Systems (DHIS) which has been upgraded to DHIS2 national wide by the ministry of health and e-mail communications in all these mentioned organizations. Hospitals are continuing spending on internet services as stated above, however, there is no literature on the little Internet knowledge usage among the health workers and it is not clear if the Internet is being used for EBP in Malawian hospitals.

1.3 Objectives of the Study

This study aims at assessing Internet usage, knowledge, and practices among health workers for Evidence-Based Practice and its effect on health service delivery in Malawian hospitals, particularly in Blantyre.

1.3.1 Specific Objectives:

The aim of this study will be achieved through the following specific objectives:

a) To determine Internet infrastructure availability, usage, and knowledge among health workers in Malawi mostly in Blantyre.
b) Investigate Internet usage behavior and patterns among medical staff
c) Evaluate the extent to which the Internet promotes Evidence-Based Practice in Malawi
d) Assess factors that affect Internet usage among health workers in Malawian hospitals

1.4 Research Questions

The following are the research questions that will be addressed by this research.

1. What Internet infrastructure is currently available in hospitals in Blantyre, Malawi?
2. What is the Internet usage pattern among medical staff in Malawi?
3. To what extent does Internet usage promote Evidence Based Practice in Malawi?
4. What are the factors that affect Internet usage among medical personnel?

1.5 Significance of Study

Internet has changed and continues to change the way people communicate and the way they do business(kare-Silva, 2011). Organizations, including hospitals, are investing in Internet in order to improve services. Internet provides a good platform for Evidence Based Practice (GERRISH & BNurs, MSc, PhD, RGN, RM, n.d.) in the hospital. Considering the fact that the use of Internet for evidence-based practice in hospitals is important, the research findings will help to inform on the extent of the Internet usage Knowledge currently available in the hospitals.

The study will also help stakeholders involved to know and improve factors that affect the use of Internet for evidence-based practice. The factors would help the stakeholders to enhance service quality for the future.

The findings from the study will also contribute to the theoretical knowledge in internet usage in healthy service delivery by using different platforms to improve health services and Evidence Based Practice.

1.6 Summary

This chapter has discussed the role of Internet in health sector and how it can add value to the health services and the challenges African countries face in the use Internet. The chapter has also discussed the Internet infrastructure and Internet skills availability in the health area. The chapter has further outlined aims and significance of the study. In addition, the

chapter also briefly outlined the objectives of the study and the research questions. The next chapter reviews different studies which are related to this work.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews relevant literature on the use of the Internet for Evidence-Based Practice in health delivery. The chapter starts by discussing the Evidence-Based Practices in section 2.2, followed by how the Internet is being accessed by health workers in Africa. Lastly, section 2.7 the chapter looks at the barriers to the utilization of the Internet.

2.2 Evidence-Based Practice

Evidence-Based Practice is the integration of the best research evidence with clinical expertise and patient values to facilitate clinical decision making (Overholt, 2005). The concept was initially developed in the medical field in the 1990s and referred to as 'evidence-based medicine' (Mcevoy, 2011).

Evidence-Based-Practice (EBP) is a problem-solving approach to clinical care that incorporates the conscientious use of current best evidence from well-designed studies, a clinician's expertise, and patient values and preferences (Overholt, 2005).

To effectively apply the Evidence-Based Practice (EBP) process, one has to have the following:

a) The basic skills required to undertake health work.
b) The person must have the ability to identify knowledge gaps and formulate relevant questions.
c) Conduct an efficient literature search and apply rules of evidence to determine the validity of studies.
d) Apply the literature findings appropriately to the patient's problem, and appropriately involve the patient in the clinical decision making (Shaheen Majid, 2011).

EBP can be better understood in diagrammatic presentation as shown in the fig 1 below.

Figure 1: Diagrammatic Presentation of Evidence-Based Practice, (Bellamy et al., 2013)

2.3 The Role of the Internet in Evidence-Based Practice

For the clinician to practice EBP, the availability of information is a key and the Internet plays an important role in information searching, processing, storage, and retrieval in the modern world. The Internet plays a crucial role in the practice of EBP by allowing health care practitioners to access and evaluate clinical evidence as they formulate their patient care strategies (Wells, 2012).

People with computer knowledge and Internet searching skills are advantaged to implement (Melnyk et al., 2010). Hospital knowledge management through the Internet interface has become increasingly important with both the hospital's intranet and the World Wide Web, providing valuable sources of evidence-based information meaning that, the Internet is the main source of EBP and other vital health information. Organizations and groups need to plan for the Internet in their projects mostly in the health sector as it is a key to providing EBP for health professionals (O'Connor et al., 2007). Internet is the tool that assists in facilitating communication and the processing and transmission of information by electronic means (Chetley et al., 2006).

2.4 Evidence-Based Practice Models

There are different models around the globe for EBP, the most common being John Hopkins Nursing Evidence-Based, Iowa, Advanced Research and Clinical Practice Through Close Collaboration. The models have been developed to assist in moving evidence into practice. Models utilization leads to an organized approach to EBP, prevents incomplete implementation, and can maximizes time resources. (Gawlinski & Rutledge, 2008)

Different EBP models have been developed, some of them are more useful in some contexts than others, and each has advantages and disadvantages. The following steps or phases are common to most models: identification of a clinical problem or potential problem, gathering of best evidence, critical appraisal, and evaluation of evidence. When appropriate, determination of a potential change in practice, implementation of the practice

change and evaluation of practice change outcomes in practice, implementation of the practice change, and evaluation of practice change outcomes (Gawlinski & Rutledge, 2008).

EBP implementations face many challenging factors, some of the notable ones are, limited access to the literature, lack of confidence in the staff's ability to critically evaluate empirical research, limited interest in scientific inquiry, a work environment that does not support or value EBP, inadequate research resources, and limited authority or power to change practice based on research finding (Hockenberry et al., 2006). The development of electronic patient records and the networking of primary and secondary care have the potential to improve the quality and efficiency of health services to improve EBP (JAPowel, 2003). There has been little research in exploring Internet access and competencies among health working professionals in Africa (Ajuwon & Rhine, 2008).

Another EBP study was conducted by a Malawian but it was focusing on exploring nurses' level of knowledge regarding EBP and their attitudes towards EBP in the prevention mother to child HIV transmission (Mulenga & Naidoo, 2017) was focusing on whereas this study is focusing on the use of the Internet for Evidence-based Practice.

2.5 Internet Access by Health Care Workers in Africa

Internet access in Africa by health care workers is a challenge due to poverty, literacy, and peoples' attitude (Adedini, 2014). Internet access has been a challenge in African countries despite being the second largest continent. It seems to be the "lost continent" of information

technologies (Odedra et al., 1993). On poverty, it has been noted that high computer costs and Internet fees in Africa has been contributing factor to less access to the Internet (Ajuwon, 2006). Less than 35% of Africans have access to basic health or medical care facilities, hence most countries hesitate to implement Internet technologies before addressing the basic needs of their people (Simba & Mwangu, 2004a)

A lack of Internet-related skills and knowledge among healthcare workers in Africa is a barrier to Internet access (Ruxwana, 2010). Lack of maintenance and technical support was seen as a barrier to the effective use of the Internet (Ruxwana, 2010).

the poor internet infrastructure in developing countries has undermined efforts to access the services to the rural areas where the majority of the people reside (Simba, 2004). one study showed that only about 0.5% of doctors searched the internet for information relating to their field, despite 72% of respondents believing that the internet had a role to play in medical practice (Farri, 2008). this is the attitude of some doctors towards the use of the internet.

2.6 Use of the Internet by Healthcare Workers

The Internet has the potential to improve the lives of people in rural communities (Ruxwana, 2010). Internet is a recommended and valuable source of up-to-date health information in health. Internet is also a cost-effective medium form of communication in the health sector. Healthcare workers use the Internet for different reasons but this study will focus on the use of the Internet for searching health-related information. Internet is

used as a source of health informationthat is relevant, up to date, and quickly accessible at a point of care (Weng et al., 2013). This promotes Evidenced-Based Practice by health care workers. There is a decrease in the use of Evidenced-Based Medicine resources such as Cochrane Library by physicians(Novak et al., 2010). However, the use of the Internet for health information for patient care was common.

Internet helps healthcare workers in getting some complex information needs therefore it is considered as a cost-effective medium of communication (Jadoon et al., 2011). Through the use of the Internet, healthcare workers can interact using different platforms such as Skype, WhatsApp. These Internet-based programs are used for sharing information and ideas on health-related issues. Healthcare workers onsite can convey information or photos to other health care workers in different locations for their input on patient management (Younger, 2010). Emails areare another Internet service that healthcare workers use a lot to send and receive information(ADELEKE, 2015). Internet is also used as an educational resource for health care workers for their career advancement (Brandtzaeg et al., 2011). Nursing students from a developing nation use the Internet as an educational resource (Breitkreuz, 2011).

The Internet has the potential to enhance the quality of health services, reduce costs, eliminate errors, and provide a platform for personal development of hospital staff, speeding up health services, and making it easier to store and access health-related information (Ruxwana, 2010). Rural healthcare systems in developing countries often

cannot provide those services locally and many villages are too distant from urban health resources to obtain what is needed.

Internet solutions (e.g. e-health, telemedicine) are often viewed as vehicles to bridge the digital divide between rural and urban healthcare centers and to resolve shortcomings in the rural health sector (Ruxwana, 2010).

The introduction of *eHealth* represented the promise of information and communication technologies to improve health and the health care system (Hans Oh, 2005). *eHealth* is another important part of the Internet. With the use of the Internet to open up new channels of communication, the transfer and transportation of a patient to a better-equipped facility can easily be arranged(Vallin, 1985). Integrated health-record systems using computers or personal digital assistants (PDAs) can document and monitor the health status of patients and the care and treatment given (Blaya et al., 2010) while facilitating information, data storage, and the sharing of patients' health records within the healthcare system.

2.7 Barriers to the Utilization of Internet

There are a lot of barriers to Internet usage by healthcare workers, such as lack of Internet access, lack of information searching skills, cost of access, and information overload (Ajuwon, 2006). The same sentiments were made but with an emphasis on access to an Internet resource. One of the other barriers to Internet access in Africa is electricity outages (Oseni & Pollitt, 2013)

Anke et al (2008) found that the most common barrier to the use of new technology were technological and organizational factors. Such factors include dysfunctional technology and lack of training (De Veer et al., 2011). A similar study mentioned a lack of computing skills as a barrier to the use of the Internet among health care workers working in a tertiary health facilities in Nigeria, (Farri, 2008). Specific to computing skills, health workers lack information searching skills (ability to search online databases), training, and time to search for online health information(Jadoon et al., 2011). The cost of acquiring Internet Technology devices has always had a negative impact on adoption in the developing world (Wamuyu, 2015)

2.8 Internet Infrastructure

The physical and technological infrastructure of the Internet is a fundamental condition for implementing changes to the used of the Internet in hospitals. Internet infrastructure refers to the availability of equipment, software, connecting devices, and other related resources in hospitals (Moses et al., 2012). According to Vanderlinde and van Braak (2010), as cited by (Moses et al., 2012) Internet infrastructure measures the perceived availability and suitability of the communication tools such as hardware, software, and peripheral equipment provided in an organization.

Setting up the necessary infrastructure requires consideration of the availability of physical infrastructure (for example, rooms for servers, computer rooms, placing of cables and network points, electricity supply points), hardware and software, and human resources to set up and maintain the infrastructure and support the everyday running (Lim et al., 2012).

In addition to infrastructure development, technical and administrative support are key for Internet service delivery (Samoilenko & Ngwenyama, 2011) in the hospitals. After ensuring sufficient Internet infrastructure, a hospital needs to employ technical personnel for maintenance work and to ensure that the infrastructure adheres to the software as well as implementation procedures. Some of the notable infrastructures which are adding value to the service delivery in the hospitals are computers, cellphones which are used by end-users.

Local Area Networks (LAN) for connecting all the systems available in the organization include network switches, routers, cabling, wireless router, and RJ45 Sockets, servers for different tasks like file store services, including backup and retrieval services, e-mail relays, servers, and SPAM filtering and DNS services and IP address management.

Internet connectivity is the connection to the outside world. For this, you need to engage an external entity called Internet Service provider (ISP) who will either connect you using fiber optic cable or using wireless. Internet service is normally payable every month. The pricing of the service depends on the capacity of the bandwidth you want to procure. But with the introduction of new technologies the internet is becoming cheaper than in the past. More recently, fiber-optic networks have been developed to handle the increased traffic levels generated by a large number of voice subscribers and an increasing number of broadband Internet users and reduce the pricing(Samoilenko & Ngwenyama, 2011)

Just like any developing country, Malawi's Internet infrastructure is fast growing as the demand is increasing. Most of the hospitals in Malawi are building Internet infrastructures

to improve their service delivery. A good number of hospitals have internet-based patient management systems which are running on the available built infrastructures.

Internet infrastructure in Africa faces some challenges which include, the government's reluctance to promote research and scientific innovation in creating economic growth pay little attention to the national need for education Internet infrastructure(Samoilenko & Ngwenyama, 2011). In addition, despite reduced Internet costs, Internet equipment in Africa remains expensive public hospitals that have limited funding.

2.9 Health Information system

The Internet belongs to the most important productivity factor of a hospital in all aspects. Health Management Systems are deployed in most of the hospitals and health offices. The deployment is one major role that Internet has played in the health industry. Literature defines health information systems (HIS) in many different ways and presents various views. Some articles focus on the organizational aspects of information processing, while others focus on the technology used.

The use of the Internet within the field of healthcare is becoming an increasingly important aspect of clinicians professional practice, improving the delivery of health services and communication between healthcare workers, as well as enhancing the decision making process through the efficient flow of information(Rowe, 2008)

To begin with, we understand a health information system as the information processing and information storing subsystem of a health care organization, which may be a single

institution, for example, a hospital, or a group of health care institutions like a health care network(Winter et al., 2011). Healthcare is an information-intensive industry and health care professionals rely on access to correct and comprehensive information, when and where they need it, at the point of care, to inform the daily decisions they make about a person's care.

Information and communications technology has brought the way to healthcare professionals generate, capture and share health information as opposed to the reliance on handwritten paper records which is prone to errors and bad handwriting (Schaper & Pervan, 2007).

Health information systems strongly influence the quality and efficiency of health care, and technical progress offers advanced opportunities to support health care. Internet enables online communication about medical issues and diagnosis of complicated diseases by linking medical practitioners who are separated geographically. They have the potential to change the delivery of healthcare services and patient care, as well as the management of healthcare systems. Internet is promoted as having tremendous potential in health to improve the collection, storage, management, use, and sharing of healthcare information. Applying any sense of logic, order, and information management principles – it seems that the benefits of electronic record keeping would naturally be far superior to paper-based record keeping(Schaper & Pervan, 2007)

2.10 Theoretical Framework

This study adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) theoretic framework. UTAUT was formulated by Venkatesh (Ibrahim et al., 2011), to explain user intentions to use an information system and subsequent usage behavior (Venkatesh et al., 2016). This is the main reason why the theory has been developed to know the intentions and behaviors of internet users

Unified Theory of Acceptance and Use of Technology has incorporated factors of TRA, TPB, and TAM, hence the most comprehensive one with extensive inclusion of factors and powerful explanation. It is considered the most important theory for technology adoption (Qingfei et al., 2008). Another important factor UTAUT has adopted from TAM is user acceptance.

User acceptance is defined as “the demonstrable willingness by an individual to employ the Internet for the task it is intended for”(Lee et al., 2003).

There are two specific beliefs, perceived ease of use and perceived usefulness these determine one’s behavioral intention to use a technology that has been linked to subsequent behavior (Taylor & Todd, 1995).

Unified Theory of Acceptance and Use of Technology has been used and applied by many educational institutions and research to answer one of the most critical questions: What are the user's attitudes towards accepting Internet solutions? Regardless of the level of available infrastructures and support administrations, there is a concern as to whether

teachers are prepared to integrate available technology into effective lessons for their students.

UTAUT has for main concepts and concepts are Performance Expectancy (PE), Facilitating Conditions (FC), Facilitating Conditions (FC), and Social Influence (SI)

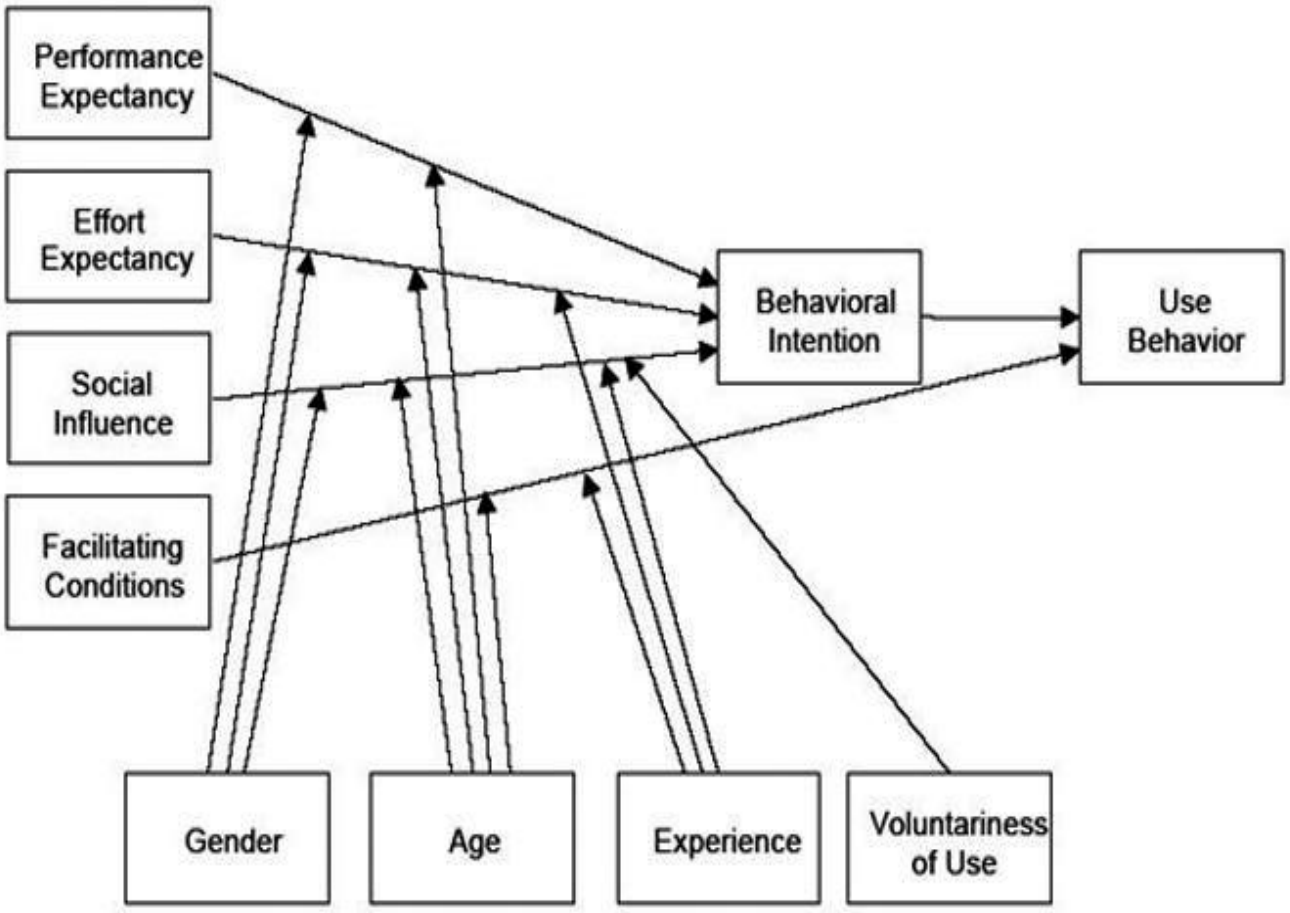

Figure 2: Four main concepts of UTAUT

Source: UTAUT (Nassuora, 2013)

Performance Expectancy (PE), which is a degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003). Performance expectancy is hypothesized to moderate the influence on the behavioral intention by gender and age. Effort Expectancy (EE), which is a degree of ease associated with the use of the system" (Venkatesh et al., 2003). Effort expectancy hypothesized to moderate the influence on the behavioral intention by gender and age, and experience. Social Influence (SI), which is a degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003). Social influence, hypothesized to moderate the influence on the behavioral intention by gender and age, experience, and volunteers of system. Facilitating Conditions (FC) is the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system" (Venkatesh et al., 2003) hypothesized to moderate the influence on the behavioral intention by age, and experience. These four main concepts are independent variables which are influenced by moderator variables: behavioral and usage, gender, age, experience and volunteers of system use have indirectly influenced the dependent variables via the four main concepts. Behavioral intention is seen as a critical predictor of technology use.

In this study Unified Theory of Acceptance and Use of Technology has been used in line with the framework's concepts. The study wanted to know if participants were using the Internet because of the Social Influence from their workmates or because the Internet was already available at the hospital or because they believed that their work will efficient if they were to use the internet and finally they thought their performance will be attained by

using the Internet. The study also wanted to find out if gander, age, experience had any influence on Internet usage.

By using this, this research investigated if Internet usage for evidence-based practice was behavior to the participants and also why were the participants using the Internet for evidence-based practice? Of what benefit was Internet usage?

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methods employed for the study. The chapter presents the research design in Section 3.2. Sections 3.3 and 3.4 outlined the research setting and study population respectively. Sample size has been outlined in section 3.5, data collection and data analysis are discussed in Section 3.6 and Section 3.7and ethical considerations have been discussed in Section 3.8 followed by the summary in Section 9

3.2 Research design

A research design is a master plan specifying methods and procedures for collecting and analyzing the required data(Creswell & Creswell, 2017). The research design helps the researcher to obtain relevant data that would fulfill the objective of the study. There are three types of research designs, namely; qualitative method, quantitative method, and mixed-method (Creswell & Creswell, 2017).

Denzin and Lincoln (2000) defined qualitative research as a set of interpretive and material practices that makes the world visible and is concerned with a qualitative phenomenon like a phenomenon relating to or involving quality or kind. It is concerned with subjective assessment of attitudes, opinions, and behavior.

Quantitative research is the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect (Luczun, 1989) Quantitative research explains phenomena by collecting numerical data that are analyzed using mathematically based methods (in particular statistics). Mixed research is a combination of both qualitative and quantitative research approaches.

This research adopted the mixed research approach to get the most reliable findings. A combination of the two provided an opportunity to analyze results from different angles in a more rigorous manner (Nyame-Asiamah & Patel, 2009). Observation, interviews, and questionnaires were used in this study for data collection.

Malhotra (2007) defined a quantitative research method as "a research methodology that seeks to quantify the data, and typically, applies some form of statistical analysis". According to (Sukamolson, (2007)) "there are four types of quantitative research, namely survey research, correlational research, experimental research, and causal-comparative research"

Survey research according to (Sukamolson, (2007)) encompasses the use of a scientific sampling method with a designed questionnaire to measure a given population's characteristics through the utilization of statistical methods.

Correlational is a quantitative methodology used to determine whether, and to what degree, a relationship exists between two or more variables within a population (or a sample). The degree of relationships is expressed by correlation coefficients.

In experimental research, the researcher investigates the treatment of an intervention into the study group and then measures the outcomes of the treatment.

Causal-comparative or ex-post-facto implies "from after the fact" (Gay, 1976). In simple terms, in ex-post facto research, the researcher investigates a problem by studying the variables in retrospect. It is research in which the dependent variable is immediately observable and now your main concern is to find out the antecedents that gave rise to this consequence. – In other words, a causal-comparative study is a form of study that tries to identify and determine the cause and effect of the relationship between two or more groups. - The causal-comparative study is a study in which the researcher attempts to determine the cause, or reason, for pre-existing differences in groups of individuals.

To be specific, survey research was used which is a form of quantitative research that is concerned with sampling questionnaire, questionnaire design, questionnaire administration for the sake of gathering information from the population under study and then analysis to

order to better know the number of participants who uses the internet for evidence-based practice.

Survey research is social science research that focuses on people, the vital facts about people, and their beliefs, opinions, attitudes, motivations, and behavior Kerlinger (1973).

And also this study used a case study research approach. Case study approach is a qualitative type of research(Kahlke, 2018). A case study involves a deep understanding of a phenomenon within a real-life context, and evidence of a phenomenon is obtained through multiple types of data sources (Yin, 1984). Case studies can be explanatory, exploratory, or describe an event. Qualitative case research is concerned with the opinions, experiences, and feelings of individuals that will produce subjective data and the data cannot be counted (Personal & Archive, 2018). Exploratory case study research tends to tackle new empirical problems on which little or no previous research has been done. Sandhursen (2000) explained that it results in a range of causes and alternative options for a solution to a specific problem.

It was also considered feasible in this research to follow an exploratory mixed research approach because it provided an insight on the level to which participants are satisfied with the use of the Internet for evidence-based practice as to arrive at the contributing factors for the participant satisfaction. The research is mainly based assessment of experiences, feelings, opinions, and factual data that people have in using the Internet for evidence-based practice (Beverley, 1996). This approach enabled the researcher to understand the problem better and address the research questions defined through a face-to-face interview,

seeking participants' opinions, experiences, feelings, and observation data collection methods.

3.3 Research Setting

The study was carried out in Malawi, in the following hospitals: Queen Elizabeth Central Hospital (QECH) and Mwaiwathu Private Hospital. These hospitals were representatives of other hospitals in Malawi. They are different in terms of source of funding and service delivery. Clients for these hospitals are also different, the most determined factor for the difference is the financial status of an individual.

QECH is one of the largest tertiary and referral hospitals in Malawi and the largest in the southern region in Malawi. This hospital represented all government-funded hospitals. Apart from being a government hospital, it also depends on donations from local companies, non-governmental organizations and international aid. This hospital is also a teaching hospital for Malawi medical and nursing schools. The hospital has both local and international medical and nursing specialists. Most of the medical research in Malawi is conducted at this hospital. It has good Internet infrastructure and systems in place funded by both donors and the government.

Mwaiwathu is one of the major and best private hospitals in Malawi. The standards for service delivery to its customers are very high at this hospital. Because of the good service which is rendered to the patients, the hospital receives clients from different areas across the country. The hospital has medical specialists in different areas and offers different

specialized services. Their Internet infrastructure and systems are very good. They have patient management systems, good internet services.

3.4 Study Population

The population as an aggregate or totality of all the objects, subjects, or members that conform to a set of specifications Polit & Hungler (1999). Data used in the study came from the following hospitals; Queen Elizabeth Central hospital and Mwaiwathu private hospital. The study population were from these professionals' clinicians, nurses, pharmacists, and laboratory technologists

Below is the table showing a total number of the employees and their respective professionals who participated in the research.

Table 1: Study Population

Study site	Clinicians	Nurses	Pharmacists	Lab	Total
QECH	110	198	16	20	344
MWAIWATHU	9	95	13	13	130

3.5 Sample Size

Kothari (2006) defines a sample as a collection of some parts of the population based on which judgment is made. Sampling deals with the selection of the population that would involve a great amount of time and resources to provide valid ideas for the study. There are two types of sampling: probability sampling and non-probability sampling. Probability

sampling is a method that uses techniques in selecting respondents while non-probability does not use any technique in respondent selection. The respondents were selected accidentally (through a reference from other respondents) hence it followed a non-probability sampling method. The study used convenience sampling which is often made up of people who meet the entry criteria and are easily accessible. Convenience sampling is a type of nonprobability or nonrandom sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or willingness to participate are included for the study. These were clinicians, nurses, pharmacists, and laboratory technologists.

Based on the numbers of employees in each of the study sites, the sample size was calculated with a 95% confidence interval, the margin of error of 5%, and with the total population of 474, the sample size required was 139. and this was adopted as the sample size of the study. The numbers were distributed according to the number of employees per hospital, the major proportion of the participants came from Queen Elizabeth Central Hospital (QECH).

3.6 Data Collection

After getting permission from relevant authorities to conduct the study, the researcher-built rapport with participants and obtained written informed consent after verbal explanations before starting collecting data.The collection of data for the study was done in a period of 6 months (from December 2017 to May 2018).

During the study, primary data were collected using face-to-face interviews, informal observations, and administering questionnaires. Interviews were used to collect data from participants. To gather in-depth knowledge, semi-structured interview questions were used. A similar set of questions was designed regardless of the type of respondent. The research spent some time in the hospital to observe how staff members were using the internet. Some of the areas observed were the interval at which internet was used, most accessed sites, devices used to access the internet. Finally, the researcher used a questionnaire to reach out to a good number of participants in the study.

The researcher used primary data on internet usage for evidence-based practice because the researchers wanted to know the current situation in the hospitals.

3.6.1 Data Collection Instruments

a) Questionnaires

A questionnaire approach was one of the tools used for data collection. The researcher formed a set of questions guided by the research objectives to address the key research areas. Questionnaires were chosen to give the researcher room to understand the participants. All the respondents were asked similar questions regardless of their different fields, experience, qualification, age, and sex. A total number of 139 questionnaires were distributed and only 105 responded in this order 30clinicians, 44nurses, 18pharmacists, and 13laboratory technologists. In the questionnaire, participants were asked whether or not they used computers, phones, and other Internet devices, how they were used and what

Internet technology tools were they using? This question assisted in knowing the numbers of people who were able to use the Internet, email, and other basic Internet programs.

The other area on the questionnaire was on evaluating the extent to which the Internet promotes Evidence-Based Practice in Malawi, the participants were asked the reliability of the usage of the Internet for solutions to work challenges

And finally to assess factors that affect Internet usage among health workers in Malawian hospitals, some of the required information gathered were gender, age, education background, government and hospital policies, and availability of Internet services.

b) Observations

Observations were one of the data collection tools in which the researcher observed an ongoing behavior without involving any questionnaire. Observations can either be participators or non-participation. (DeWalt & DeWalt, 2002) define participant observation as the process of learning through exposure to or involvement in the day-to-day or routine activities of participants in the researcher setting. Non-participant observation, on the other hand, is the type of research in which there is no intervention by the researcher.

Participant observation allows the researcher to intervene in the research environment to know and understand thoroughly the area of study in its natural setting. It enables the researcher to gather data on what is currently happening in the field of study. During the

study, the researcher used formal participant observation by hospital staff members. A total of 65 participants were observed in this order 17 clinicians, 26 nurses, 8 pharmacists, and 9 laboratory technologists. This was done to investigate Internet usage behavior and patterns among medical staff, how frequent were they using the Internet, and what type of devices they were using. This provided information on how often they use Internet, which sites do they visit most. On this objective, the frequency of Internet usage, a mean or median was calculated and reported with a 95% confidence interval.

c) Semi-Structured Interviews

A semi-structured interview approach was one of the tools used for data collection. The researcher formed a set of questions guided by the research objectives and the theoretical framework to address the key themes rather than specific questions. Semi-structured interviews were chosen to give the researcher room to improvise questions outside the predetermined ones during the interview (Myers, 2007). A non-standardized open-ended interview was conducted where a set of questions guided by an interview guide were asked to different respondents regardless of their level of knowledge. An interview guide was designed to allow the researcher not to lose focus when interviewing with a respondent. The researcher intended to interview all the participants but was not successful. Nevertheless, the researcher was successful to interview 45 participants. The interviewees were clinicians, nurses, pharmacists, and laboratory technologists. Participants were asked their level of knowledge on internet usage and how the internet has helped them in making decisions at work.

Interviews were audio-recorded and then at the end of each interview, the researcher transcribed the interview and developed the themes and codes before going to the next interview. This enabled the researcher to develop new themes at each interview point. Interviews were continuous until the researcher discovered that no new themes were developed from the new coded data. According to Camic and Yardley (2003), this point is called saturation point because the research has reached the redundancy stage where no new theme is discovered.

A total of 45 participants were interviewed. Different groups were asked how the Internet is applied to their work on daily basis and whether they use the Internet for evidence-based practice.

The semi-structured interview was chosen because it gives room for the interviewee to explain more on the research subject. At the same time, it allows a certain degree of flexibility for the researcher to respond to the answers of the interviewee and therefore develop the themes and issues as they arise.

3.7 Data Analysis and Interpretation

Data collected was deductively and inductively analyzed using the framework analysis technique by firstly classifying it into meaningful categories in relation to the research objectives, and also guided by the theoretical framework identified in the literature review.

At the end of each interview, the audio recording was transcribed into a text file. Transcribed data were then categorized according to the research objectives and the

theoretical framework. Data were categorized and assigned to themes that were identified during the data categorization. Themes were assigned with short codes that were used in the NVivo software analyzing tool. Data collection and data analysis were done concurrently, and it was easy to identify the themes. Internet usage knowledge level was measured based on the standard of a 4-point Likert scale ranging from “Excellent to “not good”. The scale was attached at the end points ranging from 1 as Excellent to 4 as not good. Since the Likert scale was used in measuring Internet usage knowledge level, data were coded in NVIVO in which was treated as an interval by assigning a value to each of the levels which were attached to the end points.

And the responses from the completed questionnaires were entered using Microsoft Excel before being analyzed using Stata version 14 for a better evaluation of the numbers of Internet usage knowledge among health workers for Evidence-Based Practice where some variables like age, gender, the personal background were deployed as some measures.

3.8 Ethical Consideration

Ethical considerations were followed in this study, before anything the researcher made sure that most of the ethical issues were followed and some of the notable ones were John Hopkins Nursing Evidence-Base as follows: The study needed to extract more information to have a very good basis to come up with possible best solutions. This study collected data of hospitals and individuals which was private hence privacy was maintained during and after the study. The interviews were conducted in private rooms.

The study investigated individual knowledge on the usage of the Internet, how the Internet is used and also in relation with their workplace place which is very private and, for this sake, the study made sure that the information provided by each individual was treated with privacy to protect and maintain their and institution's integrity. The information provided was not linked to the individuals.

Information collected in this study has been kept strictly confidential and will not be used for other purposes. There were no names or e-mail addresses on the questionnaire. All the notes taken plus the consent form have been kept and locked away safely. Only the investigator or his supervisor had access to the information when required.

Before recruiting a participant, they were briefed about what the study is all about, the objectives, and the main aim of the study. This was done to prepare the participants to make decisions whether to participate in the study or not. Written consent was obtained after verbal explanations. Consent is an ethical and legal requirement for research involving human participants hence this process.

Participation was voluntary, and participants could withdraw their participation at any time. There were no incentives for participating in the study.

3.9 Summary

The methodology chapter in general was talked about the way how the research was conducted. Some of the areas covered are how data was collected, what tools and methods

were used for data analysis. Another area of discussion in the methodology chapter was the research area, study population, sample size, and research plan.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings from the study. The results have been presented in the form of tables and graphs. Texts have been extensively used to highlight the tables and graphs. It starts by the presentation of the results on the internet availability in the hospitals, the internet usage, and knowledge. The last part discusses the factors that affect internet usage for evidence-based practice.

4.2 Internet availability

The Internet availability includes the availability of Network hardware infrastructures and software. The study found out that both hospitals they had Ethernet cables, which were used for making a physical link to the computers for internet connection. It also found out that the fiber optic cable, which is used for the Internet connection to the Internet Service Provider (ISP), and routers, which are there to route all the internet traffic to the intended route and Network switches that were distributing Internet to the entire organization Local Area Network (LAN), are available. In both hospitals, they had Wireless Access points for connecting other devices like laptops, smart phones, and tablets.

However, the study by using the questionnaires, found that the majority of the study participants were not using the internet service provided by the hospitals. Out of the 105 questionnaires respondents, 84 (80%) indicated that they were using their internet service.

Table 2: Profession Cadres

Profession	**n(%)**
Clinicians	30 (28.6%)
Nurses	44 (41.9)
Pharmacists	18 (17.14%)
Laboratory Technologists	13 (12.4%)

Table 2 above shows the summary of numbers and percentages of positions of the study participants. The study grouped the participants who were using the Internet provided by the service providers depending on their professional. The total number of participants in this study was 105. The table above, it shows that majority of the participants in the study were nurses (42%) followed by clinicians (29%).

Table 3: Institutional Internet Access Summary

Profession (n=105)	**n (%)**
No access to institutional internet	84 (80.0)
Clinicians	9(8.6%)
Nurses	6(5.7%)
Pharmacists	2(1.9%)
Laboratory Technologists	4(3.8%)

The researcher wanted to find the number of participants who use the institutional internet or those with access to the institutional access. The table above shows the distribution of the participants according to the access to institutional internet. As can be seen above, the majority of the participants do not have access to the institutional internet 84 (80%) followed by Clinicians 9 (9%).

Having mentioned the network hardware and software in the paragraph above on the availability of internet, end-user devices are another important part. These end-user devices include computer desktops, smartphones, laptops, and Tablets. In both hospitals, the study found staff members using these mentioned devices widely for accessing the internet but some of the devices were personal, and below is the distribution of the numbers of participants with respect to their area of professionalism who were not using personal devices.

Table 4:Showing People Using Hospital Devices

Profession (n=13)	**n (%)**
Clinicians	6 (47%)
Nurses	3 (23%)
Pharmacists	2 (15%)
Laboratory Technologists	2 (15%)

The majority of the participants do not have institutional devices 92 (88%). From table 3 above, the study found that out of 105 participants only 13participants had devices used to access the Internet provided by the employers. The table further demonstrates how the number and percentages of these 13 participants were distributed based on professionals. The least was pharmacy and Laboratory with 2 devices and represent 1.9% each, seconded by the nurses with the number 3 participants 2.9% and finally clinicians 6 participants 5.1%

The study also noted that institutional internet access was limited to the few individuals 21 (20%). The study also found that hospital administrators had an upper hand to institution internet access over the technical medical practitioners.

4.3 Internet usage knowledge

The study probed the participants on their knowledge of using the internet to achieve its goals. The study used a questionnaire, observation, and the theoretical framework to collect enough information. The study found that 100% of the participants knew internet usage. They acquired the knowledge differently. The study found that some participants acquired

the Internet usage knowledge from school others from friends while others were on their own. From the 105 respondents, 57(54.3%) indicated that they acquired the knowledge on their own seconded by 32(30.5%) respondents who learned from friends and the last group was those acquired from school 16(15.2%)

Figure 3 below shows the percentages source of internet usage knowledge. The figure below shows that 57 participants presented as 54.3% acquired the knowledge on their own followed by the 32 participants who learned to use the internet from their friends and its percentage was 30.5%, lastly, 16 participants indicated as 15.2% in chart below their source of knowledge was from school.

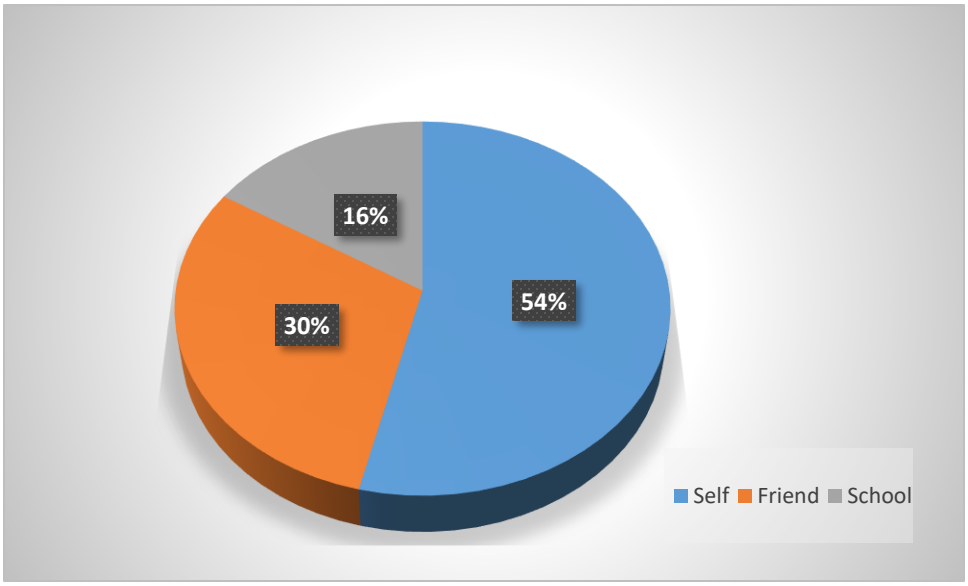

Figure 3: Showing sources of Internet usage knowledge

4.4 Level of Internet Usage Knowledge

The study also wanted to know whether all the participants were on the same level of Internet usage knowledge. By using the interviews and semi-structured questions, the study found that the participants had different levels of knowledge. Therefore three groups were developed in these categories Advanced, Intermediate and basic levels. The results showed that 15 participants had advanced knowledge which is 14.3%, 79 participants were in the intermediate level presenting 75.2% and 11 of them were rated to have a basic level of knowledge and this is 10.5%.

Table 5 below shows the frequency distribution and the percentage of responses based on the Internet usage knowledge as a level using the 3-point Likert scale (starting with 1-advanced, 2-intermediate, 3 -basic)

Table 5: Level of Internet Usage Knowledge

INTERNET USAGE KNOWLEDGE LEVEL	**n(%)**
Basic	11(10.5%)
Intermediate	79(75.2%)
Advance	15(14.3%)

The study went further to establish if all the participants were on the same level of internet usage knowledge and by using the semi-structured questions and interviews and the study

to achieve this, participants were grouped in different groups depending on different variables. The first one was age; the age groups were divided into three age categories. Table 6 below demonstrates how the ages were distributed and grouped starting from the youngest to the elderly. When defining the groups, the study considered the government recommended years for a child to start school and the years spend at government primary and secondary schools, and two years one can spend at tertiary school and the recommended Malawi government retirement age.

The second variable was education level, education level was again in three categories; these are undergraduates, graduates, and postgraduates. This was done to understand if the level of education plays a role in the knowledge of internet usage.

The third and last variable was the professional of the participants; the following areas were looked at Clinicians, Nurses, Laboratory, and Pharmacy. This was asked as well to see if a particular professional an influences the knowledge of Internet usage. Table 6 below is showing the detailed level of Internet knowledge concerning the variable deployed.

Table 6: Chi-square Distribution of the Level of Knowledge and Different Variables

		Level of internet Knowledge			P-Value
Variable	**Category**	**Basic**	**Intermediate**	**Advanced**	**P-Value**
Age	20-30	3	22	2	<0.001
	31-40	1	37	6	
	41-50	5	11	4	
	51-60	2	9	3	
Education	Undergraduate	8	17	2	0.001
	Graduate	3	42	5	
	Postgraduate	0	20	8	
Professional	Clinicians	1	22	7	0.181
	Nurses	7	35	2	
	Pharmacists	2	12	4	
	Laboratory Technologists	1	10	2	

From table 6 above the study found the age group of between 51 and 60 dominated the basic level of knowledge. From the table above, it shows that there was the relationship between age categories and the level of internet usage and knowledge ($p<0.001$)

The other area which the study probed was if one's qualification level is associated with internet usage knowledge. Therefore the study grouped the participants according to their level of academic qualification. The qualifications were grouped into three, these are undergraduates, graduates, and postgraduates. Undergraduates are the group that does not have a bachelors' degree, graduate are a category of first-degree holders and postgraduates this group is the having second degrees this can be Ph.D., Masters or postgraduate diploma. The study used semi-structured questions to determine the results and frequency distribution and the percentage of responses based on the qualification against the level of Internet usage knowledge as levels using the 3-point Likert scale (starting with 1-advanced, 2-intermediate, 3 -basic). The study found out that all the 12 postgraduates participants were in the advanced level group, from 44 graduates 35 had advanced knowledge 7 were intermediate and 2 had basic knowledge and finally out of the 49 of the undergraduates, 15 had basic knowledge, 13 intermediate, and 21 advanced usage knowledge. Derived from table 6 above, the study found that using the percentage, the postgraduate participants scored 100% on the advanced knowledge on the internet knowledge. The group graduate they scooped 79% and finally the undergraduates 43%. This shows that there was a relationship between qualifications and internet usage knowledge ($p=0.001$).

4.5 Internet use for EBP

On the use of the Internet for Evidence-Based Practice, using the semi-structured questions and the interviews with the participants, the study found that from the 105 respondents, all of them were using the Internet for EBP but in different forms. They were using the Internet in different ways to achieve one goal.

The first group of about 62 participants out of 105 representing 59% were using Internet for Evidence-based practice by using the emails to enquire the information from fellow practitioners who have experience and much knowledge like the senior practitioners or consultants and exchanging notes based on the resent research findings.

The second group were using the Internet for evidence-based Practice for searching the journals. Out of the 105 respondents, 69% indicated that they have ever searched journals on the Internet. At the time the study was taking place, 26% indicated that they were still searching the journals using the Internet. This data was collected by using the questionnaire and the Interviews. Those who were using the journals indicated that the Internet was the only way to have access to the recent journals. They said that these journals are very important for evidence-based Practice implementation because they are very rich with the most recent carried research, which provides better solutions required for the betterment of their work. The study found that the most used journals by the participants were PubMed 30% and Clinical Evidence 17%.

The third group which was using the Internet for evidence-based practice was social media users, the study found that 96% of participants were using the internet for evidence-based practice using social media. The most used platforms were Facebook and WhatsApp. The ones who were using Facebook were 70%. On Facebook, some participants were members of medical groups which were sorely created to share medical knowledge. The participants who were in the groups of this nature were 68%. Others were using WhatsApp medical groups and these were 91%. From these groups, they were able to use the internet for

evidence-based practice. These groups were composed of both local and international practitioners of different specializations.

4.6 Factors affecting EBP

The study found that there were several factors affecting the use of the Internet for EBP. Some of the factors include:

The price of the internet was expensive for one to download important document with rich information. The price for procuring the video conferencing equipment was expensive. Some of the participants said they could not afford to buy the computers because they are expensive. Because of the pricy of the computers, some participants were using smartphones to access the internet and the size of the phone screen was another limitation.

The other factor was the speed of the Internet. They reported that the Internet was very slow most of the time and for one to open the Internet page it was taking too long and at times forever.

Time was another factor affecting the use of the internet for Evidence-Based Practice, which contributes about %. Participants complained that due to the number of patients they luck time to be on the internet for EBP.

Another group of participants mentioned electricity as another factor affecting Internet usage. They said that because of the continuous power outages, they were unable to use

the internet to find relevant information for their work and most of the devices were affected due to high voltage when power was coming up.

Inadequate hardware infrastructure was another factor raised; they sighted the number of available computers and network infrastructure currently available in their hospitals.

4.7 Discussion

This section talks about a discussion of the findings of this study. The researcher starts by discussing the Internet usage knowledge available in Blantyre district hospitals. From the study results, the following have been highlighted; the study noted that there were insufficient internet infrastructures at both hospitals, but people were able to access the Internet. Most of the participants were using their resources to access the Internet. Institutional Internet services were limited to the chosen few about 20% of the respondents. It was also discovered that the administrators had an upper hand on the access of Institutional Internet service over technical medical practitioners. This is because; administrators have full access to the funds and resources, which are supposed to be distributed to the rest of their teams.

From the findings, the study understood that all the participants in the study had Internet usage knowledge. The knowledge they had was attained differently, this shows that there is no specific source of Internet usage knowledge but the sources complement one another. The other point the study picked was that the respondents had different levels of Internet usage knowledge amongst themselves; this was noted from the way they were responding

to some of the research questions. From the three categories of internet usage (advance, Intermediate and basic), many of the participants indicated that they were in the intermediate group. The study also noted that most of them were graduates and they were in the age group of between 31 and 40. The study did not pay much attention to the reasons why the mentioned groups were in the intermediate category. It was discovered from this research that most of the participants with basic knowledge levels had poor information technology backgrounds.

The study found that there are many factors, which affect the use of the Internet for evidence, based practice, some of them are to do with government policies like Internet prices. The study learned that only a few people could afford to buy adequate Internet bundles on their own.

In institutional policies, it was noted that in both hospitals, there was selective justice in choosing people that should be given access to the Internet service. Most of the people who had access to the Internet were not medical staff members but Staff members from finance, Human resource, and other clerical work. These were prioritized in getting resources for internet usage.

The power factor was another big problem from the results, which the study got from the participants. Participants did not provide enough details on how this problem can be solved. It was evident that participants were blaming the government for not doing enough to solve the problem.

The study findings have shown that health workers use the Internet equally for searching both clinical related information and personal related information.

REFERENCES

ADELEKE, I. T. (2015). Computer and Internet Use among Tertiary Healthcare Providers and Trainees in a Nigerian Public Hospital. *American Journal of Health Research*, *3*(1), 1. https://doi.org/10.11648/j.ajhr.s.2015030101.11

Ahmad, M. M., Musallam, R., & Allah, A. H. (2018). Nurses and Internet Health-Related Information: Review on access and utility. *Clujul Medical*, *91*(3), 266–273. https://doi.org/10.15386/cjmed-1024

Ajuwon, G. A.A. (2006). Use of the Internet for health information by physicians for patient care in a teaching hospital in Ibadan, Nigeria. *Biomedical Digital Libraries*, *3*, 12. https://doi.org/10.1186/1742-5581-3-12

Ajuwon, Ada, & Rhine, L. (2008). The level of Internet access and ICT training for health information professionals in sub-Saharan Africa. *Health Information and Libraries Journal*, *25*(3), 175–185. https://doi.org/10.1111/j.1471-1842.2007.00758.x

Ajuwon, G. AA. (2015). *Internet Acces sibi lit y a nd U se of O nline H ealth Infor m ation R esour ces b y D octors in T rainin g H ealthc are I ns titut ions in N ige ria*. 4.

Asangansi O. & Farri, O. M. (2008). Computer use among doctors in Africa: Survey of trainees in a Nigerian teaching hospital. *Journal of Health Informatics in Developing Countries*, *2*, 10–14.

Bellamy, J. L., Mullen, E. J., Satterfield, J. M., Newhouse, R. P., Ferguson, M., Brownson, R. C., & Spring, B. (2013). Implementing Evidence-Based Practice Education in Social Work: A Transdisciplinary Approach. *Research on Social Work Practice*, *23*(4), 426–436. https://doi.org/10.1177/1049731513480528

Blaya, J. A., Fraser, H. S. F., & Holt, B. (2010). E-health technologies show promise in developing countries. *Health Affairs*, *29*(2), 244–251. https://doi.org/10.1377/hlthaff.2009.0894

Brandtzaeg, P., Bjerre, A., Øvstebø, R., Brusletto, B., Joø, G. B., & Kierulf, P. (2011). *Journal of*. *252*(2).

Chetley, A., Trude, B., Ramirez, R., Shields, T., Drury, P., Kumekawa, J., Louw, J., Fereday, G., Nyamai-Kisia, C., Davies, J., Trude, B., McConnell, H., Ramirez, R., Shields, T., Drury, P., Kumekawa, J., Louw, J., Fereday, J., Nyamai-Kisia, C., … Nyamai-Kisia, C. (2006). Improving health, connecting people: the role of ICTs in the health sector of developing countries A framework paper. *Infodev*, *7*, 1–65. http://www.infobridge.org/asp/documents/3254.pdf

Creswell & Creswell, J. D., J. W. (2017). Research design Research design. *Research in Social Science: Interdisciplinary Perspectives*, *September*, 68–84. file:///E:/Documents/dosen/buku Metodologi/[John_W._Creswell]_Research_Design_Qualitative,_Q(Bookos.org).pdf

De Veer, A. J. E., Fleuren, M. A. H., Bekkema, N., & Francke, A. L. (2011). Successful implementation of new technologies in nursing care: A questionnaire survey of nurse-users. *BMC Medical Informatics and Decision Making*, *11*(1), 67. https://doi.org/10.1186/1472-6947-11-67

Gawlinski, A., & Rutledge, D. (2008). Selecting a model for evidence-based practice changes: A practical approach. *AACN Advanced Critical Care*, *19*(3), 291–300. https://doi.org/10.1097/01.AACN.0000330380.41766.63

Gerrish, K., & Clayton, J. (2004). Promoting evidence-based practice: an organizational approach. Journal of nursing management, 12(2), 114–123. https://doi.org/10.1111/j.1365-2834.2004.00454.xHockenberry, M., Wilson, D., & Barrera, P. (2006). Implementing evidence-based nursing practice in a pediatric hospital. *Pediatric Nursing.*, *32*(4), 371–377.

Ibrahim, R., Khalil, K., & Jaafar, A. (2011). Towards educational games acceptance model (EGAM): a revised unified theory of acceptance and use of technology (UTAUT). *International Journal of Research and Reviews in Computer Science*, *2*(3), 839–847. http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Towards+Educational+Games+Acceptance+Model+(+EGAM+):+A+Revised+Unified+Theory+of+Acceptance+and+Use+of+Technology+(+UTAUT+)#0

Jadoon, N. A., Zahid, M. F., Mansoorulhaq, H., Ullah, S., Jadoon, B. A., Raza, A., Hussain, M., Yaqoob, R., & Shahzad, M. A. (2011). Evaluation of internet access and

utilization by medical students in Lahore, Pakistan. *BMC Medical Informatics and Decision Making*, *11*(1), 37. https://doi.org/10.1186/1472-6947-11-37

Jylhä, V., Oikarainen, A., Perälä, M.-L., & Holopainen, A. (2017). Facilitating evidence-based practice in nursing and midwifery in the WHO European Region. *World Health Organization*, 1–34. http://www.euro.who.int/__data/assets/pdf_file/0017/348020/WH06_EBP_report_complete.pdf?ua=1

Kahlke, R. (2018). Reflection/Commentary on a Past Article: "Generic Qualitative Approaches: Pitfalls and Benefits of Methodological Mixology": http://journals.sagepub.com/doi/full/10.1177/160940691401300119. *International Journal of Qualitative Methods*, *17*(1), 1–3. https://doi.org/10.1177/1609406918788193

Kare-Silver, M. de. (2011). *How the digital technology revolution is changing businesses and all our lives*. Eshock

Lee, A. J., Cho, H., Gay, G., Davidson, B., Ingraffea, A., Lee, J., & Hall, K. (2003). *International Forum of Educational Technology & Society Technology Acceptance and Social Networking in Distance Learning Published by : International Forum of Educational Technology & Society Stable URL : https://www.jstor.org/stable/10.2307/jeductechsoci*. *6*(2), 50–61.

Legg, J. (2008). What is evidence-based practice? *Radiologic Technology*, *79*(5), 469–471. https://doi.org/10.1093/brief-treatment/mhh013

Lim, C. P., Kong, H., & Canada, F. M. (2012). ICT in Primary Education. *Using ICT in the Primary School*, *3*, 14–22. https://doi.org/10.4135/9781446214343.n3

Luczun, M. E. (1989). Introduction to quantitative research and analysis. *Journal of Post Anesthesia Nursing*, *4*(1), 46–48. https://doi.org/9781848608641

Mcevoy, M. P. (2011). *Evidence-based practice in allied health professions*. *April*.

Melnyk, B. M., Fineout-Overhold, E., Stillwell, S. B., & Williamson, K. (2010). The seven steps of evidende-based practice. *AJN The American Journal of Nursing*, *110*(1), 51–53.

Melnyk, B. M., Fineout-Overholt, E., Giggleman, M., & Cruz, R. (2010). Correlates among cognitive beliefs, EBP implementation, organizational culture, cohesion and job satisfaction in evidence-based practice mentors from a community hospital system. *Nursing Outlook*, *58*(6), 301–308. https://doi.org/10.1016/j.outlook.2010.06.002

Min, Qingfei, Ji, Shaobo, & Qu, Gang. (2008). Mobile Commerce UserAcceptance Study in China- A Revised UTAUT Model. *Tsinghua Science and Technology*, *13*(3), 257–264.

Morris-Docker, S. B., Tod, A., Harrison, J. M., Wolstenholme, D., & Black, R. (2004).

Nurses' use of the internet in clinical ward settings. *Journal of Advanced Nursing*, *48*(2), 157–166. https://doi.org/10.1111/j.1365-2648.2004.03183.x

Moses, P., Bakar, K. A., Mahmud, R., & Wong, S. L. (2012). ICT Infrastructure, Technical and Administrative Support as Correlates of Teachers' Laptop Use. *Procedia - Social and Behavioral Sciences*, *59*(May 2014), 709–714. https://doi.org/10.1016/j.sbspro.2012.09.335

Mulenga, C., & Naidoo, J. R. (2017). Nurses' knowledge, attitudes and practices regarding evidence-based practice in the prevention of mother-to-child transmission of HIV programme in Malawi. *Curationis*, *40*(1). https://doi.org/10.4102/curationis.v40i1.1656

Nassuora, A. (2013). Students Acceptance of Mobile Learning for Higher Education in Saudi Arabia. *International Journal of Learning Management Systems*, *1*(1), 1–9. https://doi.org/10.12785/ijlms/010101

Novak, K., Miric, D., Jurin, A., Vukojevic, K., Aljinovic, J., Caric, A., Guic, M. M., Poljicanin, A., Košta, V., Rako, D., Marušic, A., Marušic, M., & Puljak, L. (2010). Awareness and use of evidence-based medicine databases and cochrane library among physicians in croatia. *Croatian Medical Journal*, *51*(2), 157–164. https://doi.org/10.3325/cmj.2010.51.157

Nyame-Asiamah, F. (2009). *Microsoft Word - EMCIS 2009-Research Methods for OL -*

Nyame-Asiamah, F., & Patel, N. (2009). Research methods and methodologies for studying organisational learning. *Proceedings of the European and Mediterranean Conference on Information Systems, EMCIS 2009*, *2009*, 1–15.

O'Connor, A. M., Wennberg, J. E., Legare, F., Llewellyn-Thomas, H. A., Moulton, B. W., Sepucha, K. R., Sodano, A. G., & King, J. S. (2007). Toward the "tipping point": Decision aids and informed patient choice. *Health Affairs*, *26*(3), 716–725. https://doi.org/10.1377/hlthaff.26.3.716

Odedra, M., Bennett, M., Goodman, S., & Lawrie, M. (1993). Sub-Saharan Africa: A Technological Desert. *Communications of the ACM*, *36*(2), 25–29. https://doi.org/10.1145/151220.151222

Oseni, M. O., & Pollitt, M. G. (2013). *Power Outages and the Costs of Unsupplied Electricity : Evidence from Backup Generation among Firms in Africa*. University of Cambridge.

Pérez-Campos, M. A., Sánchez-García, I., & Pancorbo-Hidalgo, P. L. (2014). Knowledge, Attitude and Use of Evidence-Based Practice among nurses active on the Internet. *Investigación y Educación En Enfermería*, *32*(3), 451–460. https://doi.org/10.1590/S0120-53072014000300010

Personal, M., & Archive, R. (2018). Munich Personal RePEc Archive Qualitative Research

Methodology in Social Sciences and Related Subjects Qualitative Research Methodology in Social Sciences and Related Subjects. *Journal of Economic Development, Environment and People*, *7*(85654), 23–48.

Porter, M. E. (2001). Strategy and the Internet. *Harvard Business Review*, *79*(3). https://doi.org/10.2469/dig.v31.n4.960

Rowe, M. (2008). *Technology in Health : a Review of the Literature*. *3*(1), 68–77.

Sackett, D. L., Rosenberg, W. M. C., Gray, J. A. M., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: What it is and what it isn't. It's about integrating individual clinical expertise and the best external evidence. *British Medical Journal*, *312*(7023), 71–72. https://doi.org/10.1136/bmj.312.7023.71

Samoilenko, S., & Ngwenyama, O. (2011). Understanding the human capital dimension of ict and economic growth in transition economies. *Journal of Global Information Technology Management*, *14*(1), 59–79. https://doi.org/10.1080/1097198X.2011.10856531

Schaper, L. K., & Pervan, G. P. (2007). ICT and OTs: A model of information and communication technology acceptance and utilisation by occupational therapists. *International Journal of Medical Informatics*, *76*(SUPPL. 1), S212–S221. https://doi.org/10.1016/j.ijmedinf.2006.05.028

Shariful Islam and Nazmul Islam 2006 - Google Scholar. (n.d.). Retrieved November 1,

2021, from https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Shariful+Islam+and+Nazmul+Islam+2006&btnG=

Shortliffe E. H. (1998). The evolution of health-care records in the era of the Internet. Studies in health technology and informatics, 52 Pt 1, 8–14.

Simba, D. O., & Mwangu, M. (2004a). *Application of ICT in strengthening health information systems in developing countries in the wake of globalisation.* African Health Sciences. https://doi.org/10.4314/ahs.v4i3.7032

Simba, D. O., & Mwangu, M. (2004b). Application of ICT in strengthening health information systems in developing countries in the wake of globalisation. *African Health Sciences*, *4*(3), 194–198. https://doi.org/10.4314/ahs.v4i3.7032

Taylor, S., & Todd, P. (1995). Assessing IT usage: The role of prior experience. *MIS Quarterly: Management Information Systems*, *19*(4), 561–568. https://doi.org/10.2307/249633

Titler, M. G. (2008). The Evidence for Evidence-Based Practice Implementation. In *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Agency for Healthcare Research and Quality (US). http://www.ncbi.nlm.nih.gov/pubmed/21328760

Vallin, J. (1985). (Mortality in developing countries). *Espace-Populations-Societes*, *1985*–

3, 515–540. https://doi.org/10.3406/espos.1985.1063

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). *Quarterly*. *27*(3), 425–478.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2016). Unified theory of acceptance and use of technology: A synthesis and the road ahead. *Journal of the Association for Information Systems*, *17*(5), 328–376. https://doi.org/10.17705/1jais.00428

Wamuyu, P. K. (2015). The Impact of Information and Communication Technology Adoption and Diffusion on Technology Entrepreneurship in Developing Countries: The Case of Kenya. *Information Technology for Development*, *21*(2), 253–280. https://doi.org/10.1080/02681102.2014.948372

Wells, L. (2012). Role of Information Technology in Evidence Based Medicine: Advantages and Limitations. *The Internet Journal of Healthcare Administration*, *4*(2), 1–7. https://doi.org/10.5580/7c9

Weng, Y. H., Kuo, K. N., Yang, C. Y., Lo, H. L., Shih, Y. H., Chen, C., & Chiu, Y. W. (2013). Increasing utilization of Internet-based resources following efforts to promote evidence-based medicine: A national study in Taiwan. *BMC Medical Informatics and Decision Making*, *13*(1), 4. https://doi.org/10.1186/1472-6947-13-4

WIC. (2017). *Report on World Internet Development 2017*. 35.

Winter, A., Haux, R., Ammenwerth, E., Brigl, B., Hellrung, N., & Jahn, F. (2011). *Health Information Systems*. Springer London. https://doi.org/10.1007/978-1-84996-441-8

Ybarra, M. L., & Eaton, W. W. (2005). Internet-based mental health interventions. *Mental Health Services Research*, *7*(2), 75–87. https://doi.org/10.1007/s11020-005-3779-8

Younger, P. (2010). Internet-based information-seeking behaviour amongst doctors and nurses: A short review of the literature: Review Article. *Health Information and Libraries Journal*, *27*(1), 2–10. https://doi.org/10.1111/j.1471-1842.2010.00883.x

Zhang, W., Liu, K., Li, J., Liang, J., & Lin, K. (2015). Impacts of BDE209 addition on Pb uptake, subcellular partitioning and gene toxicity in earthworm (Eisenia fetida). *Journal of Hazardous Materials*, *300*, 737–744. https://doi.org/10.1016/j.jhazmat.2015.08.014

APPENDIX :

QUESTIONNAIRE FOR IN-DEPTH INTERVIEWS

The Use of Internet for Evidence Based Practice in Blantyre District Hospitals.

a) Demographic Data

1. Are you male or Female? *Mark only one oval.

Female

Male

2. How old are you? Mark only one oval.

20-30 years

31-40 years

41-50 years

51-60 years

3. What is your clinical professional? * Mark only one oval.

Nurse Clinician Pharmacist

Laboratory Technologist

Others

.....

..

4. What is your highest qualification? Mark only one oval.

Certificate

Diploma

Degree

Postgraduate Diploma

Master's Degree

PhD

5. How long have you worked in the health sector? *

Mark only one oval.

Less than 2 years 2-5 years

6-10 years 11years and above

6. How long have you worked at this hospital? *

Mark only one oval.

Less than 2 years 2-5 years

6-10 years

11 years and above

b) Internet Knowledge

7. Do you have email address? *

Yes

No

8. Where did you learn to use internet? *

Attended an initial training

Briefed by co-worker

On my own

Others

.....

...

9. Which of the programs have you ever used for browsing Internet? (Please check all that apply.)

Firefox Mozilla

Internet Explorer

Google Chrome

Thunder Bird

Opera

Safari

Others.....

.....

10. Which of these search engines have you ever used to obtain health information on internet? (Please check all that apply.) *

Yahoo

Google

Bing

Ask.com

Baidu

Aol

Yandex

Others

.....

.....

c) Internet Usage

11. Have you ever searched information from the Internet to assist patients? * Mark only one oval.

Yes

No

12. If your answer yes to question 11, can you give an example of what issue you searched on the internet? *

……

……

……

13. Have you ever searched for information on the internet for clinical or medical issue? *

Mark only one oval.

Yes

No

14. If your answer is yes to question 13, what are some of the clinical or medical examples? *

……

……

……

……

15. Which of the following Internet technologies has been so helpful to you? (Please check all that apply.)

The World Wide Web

Email

Chat/Online discussion

Internet phone

Internet fax

Streaming video over the Internet

Video conferencing over the Internet

Other technologies

……

……

d) Internet usage behavior and patterns among medical staff

16. Where do you mostly use internet? *

……

…….

17. Which category of sites do you visit most?

Work

Social networks

Current affairs

Sports

Others

.....

18. How often do you use Internet for social media? * Mark only one oval.

Every day

Twice a week

Once a month

Once in months

19. How often do you search clinical information on Internet? * Mark only one oval.

Every day

Twice a week

Once a month

Once in months

20. What is the main way of communication with your friends? (Please check all that apply.) *

Mark only one oval.

WhatsApp

Facebook

Skype

Viber

Google chat

Email

Twitter

Web chat

Instagram

Others.....

e) The Extent to Which Internet Promotes Evidence-Based Practice

21. Which of the online databases have you ever used to support clinical practices? (Please check all that apply.) *

Cochrane

CINAHL Complete

Clinical Evidence

Academic Search

Embase

PubMed/Medline

PsycINFO

ScienceDirect

Scopus

Others

.....

.....

22. How reliable is the information found on internet for treating a patient? (1 is excellent and 7 is poor) *

Mark only one oval.

1 2 3 4 5 6 7

23. If your answer is yes to question 22, how do you know that the information is reliable?

……

……

……

…….

24. How often do you use the Internet to search for specific clinical information?

Mark only one oval.

Daily

Once a week

Once a month

Others.....

.....

f) Assess Factors that Affect Internet Technology Usage among Health Workers

25. Which of the following personal devices do you have that is connected to the Internet? (Please check all that apply.) *

Computer

Smartphone

Tablet

26. Do you have Internet connection provided by the hospital? * Mark only one oval.

Yes

No

27. Do you have Internet connection at home? * Mark only one oval.

Yes

No

28. How fast is your Internet at work? Mark only one oval.

Fast

Very fast

Slow

29. Are you allowed to use internet during working hours? * Mark only one oval.

Yes

No

30. What challenges do you find in using Internet? (Please check all that apply.) *

Slow Internet connection

Too much information

Cost of Internet Access

Lack information searching skill

Others

.....

.....

31. What is the biggest barrier do you face in internet usage?

……

……

……

……

……..