

**INFORMATION BEHAVIOUR OF DOCTORS IN MALAWI: AN EVIDENCE-  
BASED MEDICINE PERSPECTIVE**

**By**

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**Submitted in fulfilment of the requirements for the degree of**

**DOCTOR OF PHILOSOPHY Information Science**

**In the Faculty of Engineering, the Built Environment and Information Technology**

**Department of Information Science**

**UNIVERSITY OF PRETORIA**

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**NOVEMBER 2018**

## DECLARATION

I declare that the thesis, *Information behaviour of doctors in Malawi: An evidence-based medicine perspective*, which I hereby submit for the degree of **Doctoral of Philosophy in Information Science** at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

The author, whose name appears on the title page of this thesis, obtained the applicable research ethics approval to conduct the research described in this work. The author declares that he has observed the ethical standards required in terms of the University of Pretoria's code of ethics and the University of Malawi College of Medicine Research Ethics Committee (COMREC) codes of researchers and the policy guidelines for responsible research.



1<sup>st</sup> November, 2018

## **ABSTRACT**

Evidence-based medicine (EBM) is important in the medical field and especially in developing countries like Malawi where it might promote efficient health services. An understanding of the information behaviour practices of doctors is important for the development of an EBM approach in training, education, and healthcare services, and for EBM practices in developing countries. This includes how doctors define their information needs in clinical settings, their information seeking preferences, self-rating of their information search skills, the nature of their information sources, their information use and how these relate to EBM.

Doctors in Malawi are required to keep up with global standards of medical practice and EBM practices that demand active use of clinical evidence and information, and good access to information resources and information tools. They, however, face many local challenges such as; poor doctor to patient ratio (i.e. 1:60 against a desired 1:25), big disease burdens, heavy workloads, inadequate finances and poor access to information resources. Such challenges threaten the adoption of EBM practices.

The study was conducted in Malawi as a developing country suffering from great economic challenges that bear negatively on the health services and infrastructure. The design of the study was influenced by the socio-cognitive paradigm of information behaviour and Wilson's 1996 model of information behaviour. A targeted sample of 200 doctors was identified from 400 doctors clustered within the Lilongwe, Blantyre, Zomba, Thyolo and Chiradzulu districts in Malawi. A mixed methods design was applied in which both quantitative and qualitative data was collected. Out of 200 doctors, 20 doctors were selected as key informants for the qualitative in-depth interviews. Data collection was done between September and October of 2015, and the response rate from the quantitative survey was 86.5%. SPSS was used to generate descriptive statistics from the quantitative data while thematic analysis was applied to the qualitative data from the in depth interviews.

The study found that 73% of the doctors indicated that EBM was an operating policy in their establishments, which influenced their definition of information needs. The most popular information needs related to disease diagnosis, treatment, and general patient care. However, 80% of the doctors reported heavy workloads where many saw an average of 37 patients per day. This limited the amount of time at their disposal for information seeking/searching. Other barriers to information seeking/searching were lack of access to the Internet, lack of access to credible medical information sources and lack of training in information literacy skills and EBM.

However, cellular phones played a critical role in accessing information from human sources and for enabling doctors with Internet search skills to access open source clinical evidence.

The results demonstrate that it is one thing for medical doctors to have knowledge and a positive attitude towards EBM and yet another thing to apply it in resource poor countries such as Malawi. The results also show that there were both sociological and psychological factors at play in the information behaviour of medical doctors in Malawi. This confirms the socio-cognitive paradigm and Wilson's 1996 model as the best framework for understanding the information behaviour of the doctor in Malawi. Some of the activating mechanisms and intervening variables of information behaviour of medical doctors in Malawi are unique hence the study's adaptation of Wilson's 1996 model to a model more appropriate of information behaviour for doctors in a developing country. Based on the model, a number of changes to the policies and practices of the Malawian health and medical services are recommended to support and encourage effective EBM in the country.

## **ACKNOWLEDGEMENTS**

Firstly, I am very thankful to the Lord God Almighty, Father of my Lord and Saviour Jesus Christ for enabling me to undertake this study against all odds. I was a self-sponsored part time student who mostly worked during off-hours, holidays and only took one year study leave from my work place for the field work. I really believe that with Him, nothing is impossible.

Secondly, I would like to thank my supervisor and motivator Professor Ina Fourie and the entire Department of Information Science, University of Pretoria. I am equally thankful to the Postgraduate Office of the Faculty of Built Environment and Engineering and IT, the Student Support Centre and the International Students Office of the University of Pretoria.

I am also sincerely thankful to the University Office of the University of Malawi, Principal and members of staff of the College of Medicine of the University of Malawi. I am specifically thankful to members of staff of the College of Medicine Library which I head. I also acknowledge the unwavering support that I got from the College of Medicine Research and Ethics Committee and the Dean of Postgraduate Studies of the College of Medicine of the University of Malawi and individual College of Medicine professors who encouraged me to go on with the study.

I am greatly indebted to the doctors in Malawi who were willing to be interviewed despite their busy schedules. I would fail if I would not thank the officers in the Malawi Ministry of Health both at the headquarters in Lilongwe and at the districts for the assistance they gave me during my study. I would like to thank all the hospitals that gave me consent to conduct my research in their premises. I am also thankful to Ms Melisa Ncugama, Mr Mercus Muhariwa and Associate Professor Asiyati Chiweza who were my language editors in Malawi.

My gratitude also goes to my dear wife Lorraine, who was very supportive and encouraging throughout. To my four girls: Chikondi, who is a doctor and was a vital reference point on many aspects of the study, Chifundo, Chisomo, and Chimwemwe; may the Lord bless you for all the endurance you were subjected to while I was studying.

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## LIST OF ACRONYMS AND ABBREVIATIONS

CHAM	-	Christian Hospital Association of Malawi
CI	-	Clinical Informaticist
COMREC	-	College of Medicine Research and Ethics Committee
EBIP	-	Evidence-based information practice
EBM	-	Evidence-based medicine
eBook	-	Electronic book
EBP	-	Evidence-based practice
EBSCO	-	Eton B Stevens Company for Information Service
EMBASE	-	ExcerptaMedicadataBASE
FMC	-	Federal Medicinal Centre (Nigeria)
GDP	-	Gross Domestic Product
GOVT	-	Government
HINARI	-	Health Internetnetwork for Research Information
HIS	-	Health Information Systems
HMIS	-	Health Management Information Systems
ICT	-	Information Communication Technology
MBBS	-	Bachelor of Medicine and Bachelor of Surgery
MCM	-	Medical Council of Malawi
MD	-	Doctor of Medicine
MDGs	-	Millennium Development Goals
MEDLINE	-	Medical Literature Analysis and Retrieval System Online
MNH	-	Muhimbiri National Hospital (Tanzania)



- MSTG - Malawi Standard Treatment Guidelines
- WHO - World Health Organisation

## CHAPTER 1. INTRODUCTION AND BACKGROUND TO STUDY

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### 1.1 INTRODUCTION

The core theme of this study is the information behaviour of doctors in Malawi. Its thrust and threshold is a related theme in the medical field called evidence-based medicine (EBM) and the need to have this implemented in developing countries like Malawi. EBM is recommended as a strategy that contributes towards the promotion of efficient health delivery systems by facilitating quality decision making based on best available evidence (Hisham<sup>1</sup>*et al.*, 2016a; Satterfield *et al.*, 2009; Babu, 2008; Pines and Everett, 2008; Moyer *et al.*, 2004). The adoption of the EBM paradigm implies that a doctor should have the capability to identify an information need, search literature, critically appraise the searched literature and finally use the acquired information to come up with a decision on a patient (Pines & Everett, 2008). The EBM paradigm relates to a broader paradigm known as evidence-based information practice (EBIP) or just evidence-based practice (EBP) which is an approach that promotes the collection, interpretation, and integration of valid, important and applicable user reported and research derived evidence (Booth, 2008). Booth (2008) states that in EBIP, the best available evidence that is moderated by user needs and preferences, is applied to improve the quality of professional judgments. It is from this perspective that this study sees the information behaviour of doctors as being a critical factor in the implementation of EBM in Malawi. While acknowledging the other terms related to EBM such as EBIP and EBP, this study limits itself to the term evidence-based medicine (EBM) since it is the popular term in health and medicine literature. It is also the term that is used by the World Health Organisation (WHO) in its strategic plan for Malawi (WHO, 2017).

Information behaviour (covering all information activities) (Case, 2012; Case & Given, 2016) is important to the implementation of EBM. It is assumed that developing countries face more challenges than developed countries in the effective implementation and application of EBM. A study on the information behaviour of doctors might assist the cultivation of information behaviour toward effective EBM practices.

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<sup>1</sup>References are in numerical order according to year of publication, and then in alphabetical order according to author if there is more than one reference for the same year.

## 1.2 CLARIFICATION OF CONCEPTS

Some of the terms key to this study are dealt with in more detail in Chapters 3 and 4. Before sketching the background to the study and problem statement the operational definitions for key terms, however, need to be considered:

**Doctor:** The term doctor in this thesis refers to a doctor and is treated synonymously with such terms as physician, medical expert, medical consultant, clinical expert, clinical consultant and simply clinician. The term doctor also represents the different statuses or professional grades of doctors such as; intern, registrar, resident and specialist or consultant.

**Information behaviour:** This study adopts Kirk's (2002) and Wilson's (2000) definitions of information behaviour. Wilson (2000:49) defines information behaviour as the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use. Kirk (2002) defines information behaviour as the way one relates to one's information need, information seeking, information sources and information use. These two definitions capture the key components of information behaviour which are of interest to this study and these are: information needs identification, information seeking (active and passive), information sources and information use. It is acknowledged that there are also other wider interpretations of information behaviour as mentioned by Case (2007, 2012) and Case and Given (2016) that conceptualise information behaviour as all information related activities, which are not considered in this study. This study focuses only on doctors' identification (i.e., recognition and expression) of information needs, information seeking/searching, and preferences for information sources and information use as most important information activities relevant to EBM.

**Evidence-based medicine:** This is regarded as 'a scientific procedure of the medical practice that demands that care providers (such as doctors) should dutifully, clearly and thoughtfully or prudently seek out, interpret and use the current best evidence from the clinical care research to determine the management of individual patients while taking into account the patient values' (Stahl, 2004:114).

## 1.3 BACKGROUND TO THE STUDY AND EBM

While EBM generally holds a lot of promise, Hisham *et al.* (2016a) and Leckie, Pettigrew and Sylvain (1996), specifically suggest that practicing healthcare professionals operate in a more challenging context for proactive information behaviour than academics. Akinyemi, Martineau and Tharyan (2015) and McKnight (2006) argue that evidence-based practice for doctors requires a lot of time not only for information gathering, but also for thoughtful

reflection. Akinyemi, Martineau and Tharyan (2015) and McKnight (2006) further argue that no one can retrieve reliable literature and systematically review it while watching monitors, checking patients, administering and verifying therapies, and answering telephone calls. The implication of Akinyemi, Martineau and Tharyan (2015) and McKnight's (2006) claim is that the demands on healthcare services and healthcare professionals' time leave little room for such pursuits and thereby threaten the very requirements of the EBM paradigm. The observations made by Hisham *et al.* (2016a), Leckie, Pettigrew and Sylvain (1996), Akinyemi, Martineau and Tharyan (2015) and McKnight (2006) are of significance in understanding the applicability of the EBM paradigm and the information behaviour it demands from doctors in general. The applicability of EBM in the Malawian context, where a number of challenges impact on information behaviour and the practice of EBM also need to be understood, before any recommendations can be made.

Some challenges are outlined in the subsequent paragraph:

Firstly, Malawi has a poor doctor to population ratio which threatens to overstrain the already little time a doctor would allocate to define the clinical problem at hand, search literature, appraise the acquired information items and then use them for clinical decisions on a single patient before going on to the next patient (Malawi Ministry of Health, 2017; Moyer *et al.*, 2004). The prevailing doctor to population ratio in most districts of Malawi is 1:60,000 against a government desired standard of 1:25,000 (Malawi National Statistical Office (NSO), 2012a). Secondly, The International Telecommunications Union (2015) ranks Malawi among the ten poorest countries in terms of network readiness and as such Malawi is classified as being on the disadvantaged side of the digital divide. The digital divide is associated with poor information resources, poor information infrastructure, poor Internet bandwidth and poor information practices which culminate into ineffective use of information (Heuertz *et al.*, 2003; Salinas, 2003). Thirdly, the health delivery system in Malawi is faced with yet more challenges such as a huge disease burden, tuck of financial resources and lack of material resources (Malawi Ministry of Health, 2017). The critical question therefore is: how would these and other factors affect the information behaviour of the doctors in Malawi and their ability to implement EBM? This is an important question that needs investigation in Malawi because there is no empirical work that has focused on the information behaviour of doctors. This is because empirical studies elsewhere show that similar local challenges act as barriers to doctors' information behaviour that could foster EBM (Gupta *et al.*, 2015; Li *et al.*, 2016; Akinyemni *et al.*, 2014). This study, therefore,

examines the nature of information behaviour of doctors in Malawi and how such behaviour can be supportive of EBM practices.

#### **1.4 PROBLEM STATEMENT, RESEARCH QUESTION AND SUB-QUESTIONS**

To aid doctors in Malawi to employ effective information seeking towards EBM practices, their information behaviour and factors affecting it ought to be understood. The problem at hand is that while doctors in Malawi are required to keep up with the global standards of medical practices such as EBM that demand active use of information, and good access to information resources and information tools, they are faced with local challenges. These local challenges are a poor doctor to patient ratio, inadequate finances that seem to ineffectively support the health information systems and resources and overwhelming disease burdens in malaria, tuberculosis (TB) and human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) (Malawi Ministry of Health, 2007). The key question then remains:

*How can the doctors in Malawi therefore adequately cultivate information behaviour that is motivated by the EBM paradigm and that seeks to improve health service delivery and patient care in the midst of these local challenges?*

In order to address the research question flowing from the research problem, the study focussed on the following sub-questions:

1. How do doctors in Malawi define their information needs?
2. What are the information seeking preferences of doctors in Malawi?
3. What are the self-rated information searching skills of doctors in Malawi?
4. What are the information sources that doctors in Malawi consult?
5. To what extent do doctors in Malawi use the information they acquire to inform their decision making process as a way of implementing EBM?
6. How can an understanding of their (doctors in Malawi) information behaviour practices inform EBM practices?

#### **1.5 PURPOSE AND OBJECTIVES**

Considering the lack of empirical knowledge on the information behaviour of doctors in Malawi and its links to EBM, this study utilised Wilson's 1996 model of information behaviour to deepen understanding of information behaviour practices that might support the application of EBM practices in healthcare contexts in developing countries. The study also seeks to propose an appropriate information behaviour model. The purpose of this study, therefore, was to deepen understanding of information behaviour practices if approached

from an EBM paradigm which is considered essential to the improvement of healthcare delivery and patient care in a developing country such as Malawi.

The broad objective of this study was to determine the nature of information behaviour of doctors in Malawi, factors that influence the information behaviour and whether there is any nexus with EBM. The broad objective was further broken into six specific objectives as follows:

- 1) To explore how doctors in Malawi define their information needs during problem definition.
- 2) To investigate the information seeking preferences and information seeking behaviour of doctors.
- 3) To determine the self-rating of information search skills by doctors.
- 4) To analyse the nature of the information sources that doctors in Malawi consult.
- 5) To analyse the extent to which doctors in Malawi use acquired information to inform their decisions as a way of implementing EBM in a manner that improves the health delivery services.
- 6) To explore how an understanding of information behaviour practices can inform EBM practices.

## **1.6 LITERATURE REVIEW**

This section introduces and analyses the key topics related to information behaviour with a view to provide the theoretical framework and empirical evidence that support the study's purpose and main arguments. It shows what is reported in the field and through the literature reviews demonstrates where this study fits in. An overview of the topics covered include; a general introduction of information behaviour, an appreciation of health information modelling and how it relates to general theories of information behaviour. The section also analyses some empirical studies on doctors' information behaviour and how this relates to EBM. Finally, a general assessment of information behaviour within the health services in developing countries and specifically in Malawi is presented in comparison with global trends.

### **1.6.1 Information behaviour and information activities**

Understanding the nature of information behaviour of doctors raises the need for clarity about what information behaviour is all about. Wilson (2000:49) explains information behaviour as the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use. Wilson (2000:49) further

explains information seeking behaviour as the purposive seeking for information as a consequence of a need to satisfy some goal. This may constitute those activities a person may engage in such as when identifying his or her own need for information (Wilson, 1999). This explanation encapsulates the fact that people might not realise their information needs and might decide not to react. Wilson also sees information searching behaviour as the micro-level of information seeking behaviour employed by the searcher in interacting with information systems of all kinds whether manual or electronic (Wilson, 2000). Wilson's definition of information behaviour (see section 1.2) is in alignment with the definition of other authors such as Case and Given (2016), Case (2012, 2007), Davies (2007) and Kirk (2002). What these authors have in common is that they all allude to the fact that information behaviour comprises of four major aspects namely need identification, information seeking/searching, information sources and information use. Booth (2008) in his analysis of information behaviour within the health sector and how this relates to the EBM paradigm alludes to the importance of understanding the relationship of these four aspects.

There is an extensive body of literature available on information behaviour in general, with frequent reference to the healthcare context and some of this is by Case and Given (2016), Case (2012, 2007), Courtright (2008), and Fisher and Julien (2009). Despite the extensive body of literature on information behaviour, there is very little on the context of Africa and developing countries that focuses on encapsulating the interpretation of information behaviour models or EBM models. In Africa, the focus is mainly on single isolated studies of information behaviour without aligning it to EBM such as the study by Norbert and Lwoga (2013) who investigated the information seeking behaviour of physicians at the Muhimbili National Hospital (MNH) in Tanzania, or Ajegbomogun and Ajegbomogun (2013) and finally Nwfor-Orizu, Anyaoku and Onwudinjo (2015) who studied the extent of use of health information among doctors.

### **1.6.2 Models of information behaviour and health contexts**

Wilson (1999) in his analysis of information behaviour models, such as Dervin's 1996 sense making model; Ellis' 1989 model; Ellis, Cox and Hall's 1993 information seeking behaviour model; and Kuhlthau's 1991 information seeking model, argues that all information behaviour models are related. In his argument Wilson (1999) explains that all models acknowledge that an information need results in information seeking which results in demand for information sources which further results in the need for information searching skills. He further explains that the result of all these activities is information exchange, information transfer, information use and satisfaction or non-satisfaction of the initial information need.

Other authors such as Case and Given (2016), Case (2012, 2007) and Wilson (1999) actually acknowledge the universality of Wilson's 1996 model because its 1997 and 1999 revisions took into account factors not only from the information field but also such fields as decision making, psychology, motivation, health communication and consumer research. Wilson (1999) argues that all models of information behaviour are related to one another on the basis of the aspects that they hypothesise on such as the broader information behaviour. Wilson (1999) further argues that the models are similar in the sense that they simply improve on the interpretation of the key tenets of the 1996 global model of information behaviour that Wilson himself offers. Although there are useful general models of information behaviour and components thereof, there is still a need for empirical work to test such models in specific sectors such as the healthcare sector and to adapt them according to a specific context (such as a developing country) if necessary. It is therefore not surprising that many studies in information behaviour within the healthcare sector have focused on aspects of existing models such as Wilson's 1996 model (Davies, 2007). For example, Niedźwiedzka (2003) used Wilson's 1999 model to study information seeking behaviour within the health and medical services in Poland. Niedźwiedzka (2003) suggests that the increase in information behaviour researchers that seek to review Wilson's 1996 model of information behaviour is commensurate to the increase of interest in understanding the medical professionals (like doctors), their information behaviour and the best information paradigms that can be used to study them.

Information paradigms or views, such as; the cognitive paradigm, the social paradigm and the socio-cognitive paradigm, are also important if one has to fully understand the information behaviour (Spink, 2010:79; Spink, 2010:96). The interest on the information behaviour paradigms is fostered by the need to focus on the information seeker and all aspects of his or her information behaviour (Spink, 2010:79; Spink, 2010:96).

Alongside the research interest in information behaviour in health, has emerged the push towards a transdisciplinary model of the EBM paradigm within medical practice which hinges on doctors who are referred to as clinical experts (Satterfield *et al.*, 2009). Satterfield *et al.* (2009) in their proposition for a multidisciplinary model for EBM, observe that there is no unified modelling of evidence-based practice for medicine. Satterfield *et al.* (2009) efforts to present a unified model for EBM are elaborated in Chapter 3. Davies (2007) argues that the studies reported regarding the health sector are mostly descriptive studies based on empirical work without taking this through to theorising and substantial contributions to the theory of information behaviour. It should also be noted that many of the extensive studies



that have been conducted in information behaviour in healthcare e.g. by Case *et al.* (2005), Leydon *et al.* (2000), and Mayer *et al.* (2007), put more focus on the patient's or families' information behaviour than on the doctors' information behaviour. Specific studies on doctors and information behaviour include the work by Tiburt, Goold, Siddiqui, and Mangrulkar, (2007), Parboosingh (2002) and Harries *et al.* (2000) which are analysed section 1.6.3. More empirical studies on information behaviour are analysed in Chapter 4 of this study.

### **1.6.3 Doctors and information behaviour**

The aspects that are highlighted from these studies range from use of information by doctors in real time (Tiburt *et al.*, 2007), doctors' acquisition of new pieces of information in their places of practice (Parboosingh, 2002), and self-knowledge in making judgements (Harries, Evans & Dennis, 2000). All these studies selected from the last twenty years offer a historical perspective of the information behaviour challenges of doctors and contribute to the general understanding of both health information and evidence-based medicine modelling. Although these studies are descriptive empirical studies and do not suggest or offer specific models of information behaviour, they are useful in understanding some aspects of the information behaviour of doctors.

Tiburt *et al.* (2007) conducted a study on how doctors use information in real time at the John Hopkins University in Baltimore, USA. Their study sought to describe information exchange behaviour among internal medical students. They used a qualitative approach for a sample population of 89 and discovered four themes of information exchange behaviour. The first theme was questioning behaviour which is used during communication with people. The second theme was the searching behaviour for information resources. For instance, how did they search for physical and electronic information items? The third theme focused on how they reacted to unsolicited knowledge offering and the fourth theme focused on answering behaviour and how they responded to questions and queries that were put before them. Tiburt *et al.* (2007) concluded that clinic interactions between resident and attending doctors relied heavily on spoken deliberations without resorting to the scientific literature. They suggested that future research should deal more readily with the relationship between information resources and how these are used to guide decision making within medical practice. They also claimed that information needs of practicing doctors often go unmet, thereby threatening the very tenet of EBM. Tiburt *et al.* (2007) further claim that some of the factors that contribute to the doctors' information behaviour are; access, habit, reliability, quality, speed and ability to use information resources. Their study emphasised the vitality of the doctors'

acquisition of new pieces of information in their practice if they had to adequately address the question of evidence. The Tiburt *et al.* (2007) study contribute to appreciation that the information needs of doctors can be unmet thereby justifying more research into their information behaviour.

Parboosingh (2002) proposes that doctors' best way of learning how to acquire new pieces of information in their practice, is through their communities of practice as they interact with their colleagues. According to Parboosingh (2002), the community of practice creates a good environment for learning and enhances their professional practice and judgment which directly influence their ability to make quality decisions. Parboosingh (2002) argues that although doctors acquire new pieces of information through interaction with colleagues, few physicians value keeping records of the learning process which is important if technology has to enhance learning in the communities of practice. Parboosingh (2002) finally points out that information communication technology (ICT) related evaluation of learning activities, such as knowledge sharing, knowledge creation and facilitation of collaboration among doctors is relatively new amongst many physicians and it has not been seriously done. This agrees with Moyer's *et al.* (2004) claim that the EBM paradigm is a recent phenomenon which only became significant in 1991. The extent to which such a new paradigm as EBM is being embraced by doctors in Malawi in a manner that would have them measure their self-knowledge against new sets of knowledge in medical judgement is a matter of empirical interest.

Harries *et al.* (2000) report two separate studies in the United Kingdom that involved measuring the nature of self-knowledge in the judgment making of 32 family physicians (study 1) and 30 general medical practitioners (study 2). The results from these two studies highlighted the need for the physicians' meaningful acquisition of new pieces of information which would positively influence the way they would use information in general. In both cases it was found that although the physicians and medical practitioners had similar information selection patterns, their information uses were dissimilar. Information use, the studies found, was consistent with the likelihood that the knowledge they had was dependent on the extent to which they attended to new pieces of information. The extent to which access to new pieces of information might be a challenge to doctors in developing countries and specifically to Malawi whose health information systems are yet to be fully developed is reported in chapters 6 and 7. Section 1.6.4 reviews challenges reported in the literature on the development of health information systems and the information culture of health professionals in Malawi.

#### **1.6.4 Related Malawi studies**

Significant efforts by the Malawi Government to establish an information culture within the Ministry of Health can be traced as far back as 1999 when the Government sought to keep in step with the World Health Organisation (WHO) standards on health information systems. This saw the evolution of a health information system national policy. The Malawi Ministry of Health (2017, 2003) reports that the main objective of the health information system national policy is to provide a strategy for management and use of information for planning, management and monitoring of the health sector performance. Ultimately, the main objective of these efforts is to improve the information behaviour of health professionals and health service delivery in Malawi. However, the Malawi Ministry of Health (2017, 2003) acknowledges in its national policy document for the health information system that despite some achievements, the realisation of good information practices for its health professionals on the whole is still an outstanding issue. Some studies which have been conducted in Malawi buttress this point and throw some light on why this has been the case.

For example studies by Selemani (2017), Wella (2014), Scandvand (2007), Galimoto (2007), Mawindo (2006) and Chiweza (2005) examine the Malawian health information system or explore the potential of electronic information resources in Health and Medicine accessible within the country. However these studies hardly address the question of information behaviour of doctors. For example while conducting a country health equity analysis Banda *et al.* (2006) established that health outcomes in Malawi are affected by the high levels of poverty, illiteracy, HIV/AIDS and weak access to the public health services. The outcome of their survey was the establishment of priority areas which did not include improvements of the information infrastructure which would again support effective information seeking and EBM. The top priorities of the 2006 health equity survey were only identified as fair financial support to services, strengthening human resource capacity, procurement and management of essential drugs and ensuring equitable access to antiretroviral (ARVs) drugs.

Similarly, Scandvand (2007) conducted a study titled ‘Organisational Strategies for Improving Health Information at District Level’. The study focused on examining existing structures that were in place to support the health information system policy. He established that these structures are anchored on supervision and a recognition scheme. He proposed that the health information system in Malawi should also be anchored on pair reporting as in pair programming which is a software development technique in which two programmers work together at one work station: one person types while the other reviews (Williams, 2001). Scandvand (2007) found that the challenges to the full implementation of the health

information system include health facility staff's poor performance in working with a health management information system due to shortfall of staff and poor training. The challenges, Scandvand (2007) found, had the potential to compromise the quality of data and information thereby threatening to compromise the quality of decisions doctors and other health workers would make based on the erroneous data. However, it remains uncertain as to whether Scandvand's (2007) findings would have uniform application to all doctors.

Galimoto (2007) conducted a study titled 'Integration of Health Information Systems: Case Study from Malawi' that assessed the health information system in Malawi and identified where fragmentation existed with a view to promoting integration. Galimoto (2007) studied the health information system at several levels with a view to understand the flow of data in the system, and to identify information needs and information use at district health management office level. She also identified the responsibilities and duties of the District Programme Manager and the District Health Manager (i.e. the doctor in charge of the health services in the district) in relation to their information needs. The study found that fragmentation existed and recommended that health management information systems considered social and technical practicalities for integration. It also found that district health management teams in Malawi have a vast range of information needs including health data and drug logistic data. The study concluded that fragmentation of health data had the potential to influence the quality of data and in the long run the quality of medical decisions based on the same data. However, no direct reference was made to the information behaviour of the doctors and the extent to which it would be influenced by the observed fragmentation in Malawi's health information system.

Chiweza (2005) conducted a study that investigated the potential for electronic information resources within the health and medicine fields to narrow the digital divide between the north and south. Using a hundred sample citations from the International Science Institute's (ISI) high impact journals in Health and Medicine, he compared their deliverability from both the physical and electronic resources of College of Medicine of the University of Malawi (UNIMA) in Malawi and Curtin University of Technology (CUT) in Australia. While the deliverability of the sample citations from the physical resources of University of Malawi's College of Medicine was poorer than that of Curtin University of Technology in Australia, University of Malawi's College of Medicine edged Curtin University of Technology in delivering electronic sample citations. This suggests that the electronic information resources have the potential to equalise information access opportunities on both sides of the digital divide. Chiweza (2005) concluded that for this potential to be sustained, Malawi, like all

developing countries must overcome the challenge of poor Internet connectivity and poor bandwidth. However, this study did not explore the extent to which doctors in Malawi were exploiting such a potential for electronic resources to enhance EBM.

Mawindo (2006) carried out a study that compared the use of electronic and physical resources in the Library by medical students at the College of Medicine of the University of Malawi. The study established that more students preferred to use the physical resources despite the potential of the electronic resources revealed by Chiweza (2005). Mawindo (2006) found that more students demonstrated very poor information seeking behaviour skills. She concluded that poor information seeking behaviour by medical students in their training years would pose a threat to the attainment of good information seeking behaviour in their practicing years.

In summary, the literature on health information and information behaviour in Malawi, though elusive in terms of detailing the information behaviour of doctors and EBM, demonstrates that although there are efforts to implement health information systems and to improve the information behaviour of health professionals, there are many gaps that have to be attended to if progress is to be made. These studies reveal that there are infrastructural problems in Malawi's health information system and limited skills among health professionals and these bear negatively on their information seeking behaviour. The salient issues from the Malawian studies and the projected challenges suggest that the digital divide could be a factor in influencing the information behaviour of health information professionals such as doctors.

#### **1.6.5 Information behaviour and the digital divide**

Lack of access to relevant content, poor quality of information resources, poor ICT infrastructure, such as lack of access to hardware and low bandwidth, and poor information literacy skills is often linked to the concept of the digital divide (Heuertz, 2003; Salinas, 2003). Articles that specifically report on information behaviour and the digital divide, include: Kontos *et al.* (2014) who reported on predictors of eHealth usage: insights on the digital divide from the health information national trends survey 2012 and Renahy, Parizot and Chauvin (2008) who reported, 'Health information seeking on the Internet: a double divide.'

An implication arising from this discussion is the fear that doctors in a developing country such as Malawi could have poor information practices that are induced by the socio-economic and infrastructural challenges of the environment they are in. This observation is of

interest to this study because Wilson's 1996 model of information behaviour, which is discussed in detail in Chapter 4, refers to the environment of an information seeker as an intervening variable (Wilson, 2000). However, one's perception of the digital divide often influences the way one proposes to address it, especially if it is suspected that it may foster poor information practices. While many traditional proposals to address the digital divide have often hinged on mere provision of ICT, Fourie and Bothma (2006) propose that attempts to address the digital divide should be looked at on several levels which they call quadrants. Firstly, they argue that besides supporting infrastructures and ICT access which is just the first level, there ought to be information available going via the ICT. This information must be accessed and knowledge must be developed and shared, and must be found by those who want it. This implies that there must be abilities of information seeking, using information, creating new knowledge and communicating new knowledge. Secondly, such abilities would be affected by the following aspects: the individual or group commitment to a specific problem, use of ICT and information infrastructure, exploitation of the knowledge infrastructures, information seeking and developing of information seeking skills, use of information, creation of new knowledge and group communication of knowledge. These aspects resonate strongly with the main characteristics of the theoretical assumptions of information behaviour models highlighted by Kirk (2002) and Wilson (1999), namely information need definition, information seeking and information searching and information use. Thirdly, Fourie and Bothma (2006) argue that the skills and abilities could spiral up so as to affect an individual or group level, as well as research efforts, presentations with colleagues, co-authoring, co-presentation, individual publication, individual presentation, lecturing, teaching and training in case of their academic environment and referencing and supporting others. Fourthly and finally, Fourie and Bothma (2006) envisage that the fourth level effect of addressing the digital divide in information use and behaviour is that it would affect advocacy and initiating access to ICT infrastructure. Such advocacy, they further argue, would also affect initiation of knowledge infrastructures via ICT such as creation of communities of collaborative learning, information seeking, research and work; communities to support higher order, creative, innovative and lateral thinking; communities of knowledge building and knowledge sharing; creation of communities of practice and the setting of trends in exploiting new opportunities. Fourie and Bothma's model on bridging the digital divide through teaching information retrieval (IR) was presented in the context of teaching. It might, however, also prove useful in studying information behaviour of doctors in the EBM context in a developing country such as Malawi.

### **1.6.6 The challenge for developing countries**

A number of challenges are observed in Africa in the past fifteen years with regard to the development of vibrant health information systems that ought to facilitate good information behaviour for doctors. Musoke (2000) observes that the major challenge for Africa in general and Uganda specifically, is the lack of research into information use within the health sector. Musoke (2000) also notes that research surveys in Africa have focused more on the creation of information systems and access to information than on information use. Komakech (2005) agrees with Musoke (2000) when in his analysis of the major challenges of the Ugandan health information system, he concluded that the major challenge is information use. This view is also shared by Mandelli and Giusti (2005) who argued that although Uganda is successful in implementing the health management information system, the focus is more on disease surveillance reports and key output indicators than information use. Mandelli and Giusti (2005) further argued that the health management information system (HMIS) should be a tool for fostering informed decision making for health information professionals such as doctors and this can only come about because of good information use. Kintu *et al.* (2005) suggest that Uganda's experience with HMIS and information use is a mirror of the challenges that should be expected in many developing countries. Nsekuye (2007) sums up the challenges in developing countries as lack of proper use of information within the health delivery systems, too few health staff, and lack of training in information tools like HMIS.

Ogilvie *et al.* (2005) account for the few health professionals in Africa as due to their migration from Sub-Saharan Africa to the West. Mosse and Byrne (2005) specifically observe that while Africa is losing its health professionals to the West, its remaining small number of health professionals have to cope with information communication technology (ICT) tools for health information systems that are designed for the Western social contexts. They further argue that any design of ICT tools for health services should be sensitive to the social contexts of the implementing countries. The implication of the observation by Mosse and Byrne (2005) is that the information culture of Africa is different from the information culture of the West. Mosse and Byrne (2005) argue that Africa has collective information culture which is the contrary of the individualistic information culture prevalent in the West. These differences bear on the extent to which health information systems in Africa can be used and sustained.

Kimaro and Nhampossa (2007) while reviewing health information systems in Tanzania and Mozambique, note that the major challenge in Africa is sustainability of health information systems. Kimaro and Nhampossa (2007) argue that Africa lacks political will and financial

resources to set up health information systems and sustain them after the initial funding from a donor. It is in light of these challenges that Jacucci, Shaw and Braa (2006) conceptualise that friction between global standards and challenging local realities are real issues in many developing countries. Jacucci, Shaw and Braa (2006) specifically note that global standards for information tools and instruments, such as health management information systems software developed in the West, have to be adapted to suit the local realities of developing countries. All the above-mentioned challenges have also been observed in Kenya by Odhiambo-Otieno (2005) and in Malawi by Chaulagai *et al.* (2005).

## **1.7 METHODOLOGY**

This section briefly introduces the research approach that the study used for gathering data. Detailed discussions of the approaches that the study uses are given in Chapter 5. The section also discusses the mixed methods approach adopted in this study, and provides examples of a few studies that used the selected methodological approach. The section also looks at how study populations were sampled, how the data was analysed, ethical considerations, research limitations and a proposed outline of the chapters for the study.

### **1.7.1 Research paradigm and approach**

A research paradigm is defined as the nature of reality (ontology), the philosophy of how that reality is known or the relationship between the knower and the known (epistemology) and the practice of how that reality comes to be known (methodology) (Pickard, 2013). To find answers to the research question of this study, a pragmatic research paradigm was selected in order to fully address the research questions. A pragmatic research paradigm is an emerging paradigm that allows the use of both inductive and deductive reasoning through various combinations of quantitative and qualitative data (Creswell, 2014; Creswell & Plano Clark, 2010; Jacobs, 2010). The use of qualitative methods on the one hand, enables researchers to capture the social and institutional contexts of people's lives besides enabling them to access non-quantifiable information about people's understanding and perceptions, how they make sense for themselves and how they give meaning to daily lives (Creswell, 2014). On the other hand, the quantitative approach allows researchers to collect information on the prevalence of various activities, the people who participate, and popular conceptions of needs from a sample of selected groups (Creswell, 2014).

Case and Given (2016), Case (2007, 2012) and Wilson (2005) report that as much as quantitative research methodology is common within information science research, recent approaches to information behaviour research are accommodating qualitative approaches. A combined research methodology consisting of quantitative and qualitative approaches is



therefore often reported for research on information behaviour. For example: Munyua and Stilwell (2010) who studied agriculture knowledge and information systems (AKIS) of small-scale farmers in Kiriyaanga in Kenya. Vilar and Zumer (2011) used a mixed methods approach for studying the information behaviour of young Slovenian researchers. Williams and Coles (2007) in their study titled 'Evidence-based practice in teaching: an information perspective' also used a mixed methods approach like Jamali and Asadi (2011) did during their study on 'The role of Google in scientists' information seeking behaviour'.

#### **1.7.1.1 Qualitative approach**

The study chose a phenomenological qualitative research approach in order to address sub-question 1 which relates to doctors and information needs definition, sub-question 5 on how doctors' information use relates to decision making and EBM, and sub-question 6 on how the understanding of information behaviour practices can inform EBM practices. Phenomenology seeks to understand how persons under study construct meaning and a key concept is intersubjectivity (Creswell, 2014). The aim of phenomenology is to study the human phenomena without considering the questions of their causes, their objective reality or even their appearances (Wilson, 2002; Creswell, 2014). Previous studies on various aspects of the information seeking behaviour of doctors such as those by Lokman, Gabriel and Nicolson (2011) and Murphy and Maguire (2011) used phenomenological approaches. For example, Lokman, Gabriel and Nicolson. (2011), collected stories from a population of 48 doctors during their study on hospital doctors' anxieties at work and their phenomenological analysis focused on two stories that were most revealing. This approach enabled researchers to capture and understand the respondents' perception of the problem under study beyond the investigator's prejudiced understanding of the same problem. Thus this study adopted the phenomenological approach in order to allow the doctors under investigation in Malawi to tell their own story in their own words so as to appreciate the phenomenon in the lived context as suggested by Wilson (2002).

#### **1.7.1.2 Quantitative approach**

In addition to the qualitative approach, the study selected the quantitative approach in order to address sub-question 2 on information seeking preferences of doctors in Malawi, sub-question 3 on doctor's information searching skills, and sub-question 4 on the information sources the doctors consult. This approach goes well with the behaviourist models of information behaviour which define it in terms of skills and attributes that can be quantitatively measured with scientific tools such as questionnaires (Bruce, 1997). For example, the Standing Conference of National and University Librarians' (SCONUL) (1999)

seven pillar core model on information literacy which defines an information literate person on the basis of the seven things that they are able to do with information such as: recognise the information need, identify it, understand its scope, manage it, gather it, evaluate it and present it. Information literacy itself is defined as the attainment of the appropriate information behaviour (Bowman, 2007). Another example is the 1989 presidential paper of the American Library Association (ALA) which lists the abilities of information literate people. ALA suggests that information literate people must be able to have skills that recognise their information needs, locate the information sources, find and evaluate the information sources, organise the sourced information and use the information in a manner that addresses the information problem at hand. Drawing from SCOUNL (1999) and ALA's (1989) conceptualisation of skills and attributes of information literate people, this study developed a scientific questionnaire and conducted structured interviews to capture the information sources, skills and preferences of Malawian doctors. Data were collected from both primary and secondary information sources.

### **1.7.2 Study population and sample**

For the quantitative component, this study targeted a sample population of 200 doctors in Malawi. The Medical Council of Malawi's 2015 register was used as the sample frame of the study. This registry was used because it is an authoritative account that provides an up to date record of medical practitioners of all ranks and file from both the public and private sectors. It also shows their contact details, qualifications, employment status and training background. The Medical Council of Malawi register showed that 600 doctors were registered in 2014-2015. Of these, the majority (400) were clustered in Lilongwe, Blantyre and surrounding districts of Thyolo, Chiradzulu and Zomba.

For the qualitative part, 20 doctors were selected as key informants. From the studies of Harries *et al.* (2000) and Tiburt *et al.* (2007) which have been discussed in section 1.6.3, a sample of 30 to 90 seems acceptable in health information research explorations of doctors, especially when using interviews and qualitative research approaches.

### **1.7.3 Selection of participants**

This study through a combination of sampling methods selected participants from both rural and urban hospitals in Blantyre and surrounding districts in Malawi. Lwanda (2007) writing specifically about Malawi identifies two environments in which the doctors in Malawi work; the first one has been dubbed the global environment which is urbanised and tends to have a culture and resources similar to those of the West and the second one is what he calls the local environment. The local environment is the rural environment that lacks most of the

resources that the urban environment has. This study therefore involved participants from both environments and with all types of training backgrounds as listed by Lwanda (2007). These include: (1) Malawians trained in Malawi, (2) Malawians trained abroad, (3) Malawians trained both in Malawi and abroad, and (4) expatriate doctors trained abroad but working in Malawi on contract. The 2015 Medical Council of Malawi registry reveals that doctors are more clustered in Blantyre (and its surrounding administrative districts of Thyolo, Chiradzulu and Zomba) and Lilongwe administrative districts. Through a combination of a multi-stage cluster sampling and purposive sampling, the hospitals and participants were selected for a quantitative approach and for the focus group for the qualitative approach in a manner that was mindful of Lwanda's (2007) categories of doctors.

#### **1.7.4 Data collection methods and instruments**

This study used two types of research methods: Firstly, it used a cross-sectional survey where a questionnaire with closed questions was administered to 200 doctors. Secondly, the study used in-depth interviews where 20 doctors were interviewed as key informants using an interview schedule.

#### **1.7.5 Data analysis**

The qualitative research findings were analysed using thematic analysis with the assistance of the Research Support Centre of the College of Medicine of the University of Malawi. The quantitative research findings were analysed using Statistical Package for Social Sciences (SPSS), again with the assistance of the Research Support Centre of the College of Medicine of the University of Malawi.

#### **1.7.6 Ethical considerations**

Denscombe (2007) notes that researchers ought to act ethically, not only in the collection of their data but also in the process of analysing the data and in the dissemination of findings. He argues that the ethical guidelines protect participants from researchers who might be tempted to use any means available to advance their state of knowledge on a given topic. This research study complied with all the ethical considerations of both University of Malawi's College of Medicine Research and Ethics Committee (COMREC) which approves medical research in Malawi and the Faculty of Engineering and Built Environments (EBIT) at the University of Pretoria from which permission to collect data from participants was requested and obtained before proceeding with data collection. The researcher ensured that all the data collected was credible and trustworthy, that all the participants were given written informed consent and that they had the right to withdraw. Permission for recording interviews was also obtained in writing. This position is in keeping with the four general ethical guidelines which

are commonly followed in investigations involving humans namely: firstly, that participants should not be harmed in any way, secondly, that at no time should participants be deceived, thirdly, that any participation must be voluntary and finally, that all the data must be confidential or anonymous (Case & Given, 2016; Creswell, 2014; Case, 2012, 2007; Leedy & Ormrod, 2009; Mouton, 2001). This study did abide by all these ethical tenets.

### **1.7.7 Research limitations**

The doctors' lack of time was one of the major challenges to this research. The poor doctor to patient ratio was another challenge that entailed that special appointments had to be made because doctors in Malawi were very preoccupied. This affected the amount of time that the doctors had for this research. While these were seen as challenges and therefore possible limitations, they also remained the major motivating factors for this research. The challenge of distance from one doctor to another was overcome in the following ways: Firstly, the study gave priority to interviewing doctors from Blantyre and the surrounding districts of Zomba, Thyolo and Chiradzulo in Southern Malawi. Secondly, the study accommodated the option of interviewing doctors from the Lilongwe district cluster in the central region. In some instances, the study interviewed the doctors through ordinary phones, mobile phones and even Skype phones and where this was the case, special arrangements were made to have the doctors sign the informed consent form.

### **1.8 SIGNIFICANCE OF STUDY**

This study contributes to the debate on the interpretation of information behaviour paradigms and models in general and specifically, the applicability of Wilson's 1996 model of information behaviour to a developing country such as Malawi. Wilson (1999) suggests that the limitations to his information behaviour model are that it does little more than provide a map of the research area and draws attention to the gaps for further research. According to Wilson (1999), his model provides no suggestions on causative factors to particular information behaviour under review nor does it provide any hypothesis to be tested. This study addresses the gaps pointed out by Wilson (1999) and his critics such as Niedźwiedzka (2003) with specific reference to studying information behaviour related to EBM in a developing country. These findings have the potential to be used to make recommendations on information behaviour that is supportive of EBM. Thus the study will add to the literature on the understanding of Wilson's 1996 model from the perspective of EBM and of a developing country.

The findings of this study have further potential to guide policy development and practices within the health field in Malawi with regard to health information systems, health services, the training of doctors, and workplace information literacy policy of health training institutions in Malawi.

## **1.9 OUTLINE OF CHAPTERS**

This section presents the outline of the thesis which has nine chapters and is listed as follows: Chapter 1 is titled ‘The Introduction’ which consists of the introduction to the study, its background and its context. This contains the motivation of the study, the research problem statement, the research questions and sub-questions. The chapter also gives a brief literature review on information behaviour and how it relates to the health sector and specifically doctors. A brief literature review on Malawi is also given before the chapter finishes with presentation of the methodology of the study, the significance of the study and an outline of thesis chapters.

Chapter 2 is titled ‘Setting the Malawi Context.’ This chapter details the major Malawian potential activating mechanisms and intervention variables to the information behaviour of the doctor in Malawi.

Chapter 3 is about ‘Evidence-Based Medicine’ as a major potential for enhancing the information practices (including seeking, use and decision making) of doctors. The chapter defines EBM besides briefly reporting on attempts at EBM modelling. It also looks at available empirical literature on EBM and the key challenges that doctors face as they attempt to implement it. The empirical literature makes it evident that the information behaviour of the doctors is critical if the EBM model shown in figure 3.1 and 3.2 in chapter 3 is to succeed.

Chapter 4 discusses ‘Information Behaviour’ as the main variable of the thesis. It analyses the information behaviour paradigms, models and empirical studies relating to information behaviour of doctors in more detail. It elaborates on why this study chose the socio-cognitive paradigm and the Wilson 1996 model as its frameworks to study the information behaviour of doctors.

Chapter 5 presents ‘The Methodology’ of the study in a more detailed way. It discusses the research frameworks and assumptions, research approach; quantitative and qualitative, instruments for data collection i.e. the questionnaire, and the interview schedule for the key informants, the research method survey, the study population and sampling, the validity and reliability, ethical considerations and data analysis.

Chapter 6 is titled ‘The Quantitative Results.’ The chapter presents the quantitative results that were analysed using SPSS.

Chapter 7 is titled ‘The Qualitative Results.’ The chapter presents the qualitative results that were analysed using thematic analysis and coding.

Chapter 8 is titled ‘The Discussion of study results and triangulation.’ In this chapter a detailed analysis of the extent to which the research questions are answered is given. This chapter triangulates findings from the quantitative data, qualitative data and the literature reviews presented in Chapters 3 and 4. It also assesses the value of the Wilson 1996 model for an information behaviour study from an EBM perspective.

Chapter 9 is titled ‘The Conclusion and recommendations’. A summary of the key issues from the study and implications for the medical policy and practice in Malawi based on the successes and challenges of this study are also given.

## **1.10 CONCLUSION**

The chapter has highlighted the importance of understanding the information behaviour of doctors in line with the EBM paradigm and its importance for the quest to promote efficient health services in developing countries. The chapter has also outlined a few empirical studies in the area of doctors and their information behaviour in the clinical setting, highlighted the local challenges of the Malawian doctor; presented the research problem, research questions and the research sub-questions and objectives arising from the research question. The empirical studies pointed out that an understanding of the information behaviour practices of doctors is important for the development of an EBM approach in training, education and healthcare services, and for EBM practices in developing countries. This chapter also discussed the research design and methodology and finishes with an outline of the chapters of the thesis. Chapter 2 describes the Malawi context in which the research was conducted.

## CHAPTER 2. SETTING THE MALAWI CONTEXT

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### 2.1 INTRODUCTION

This chapter presents Malawi as a context with special challenges for investigating and discussing the information behaviour of doctors. The chapter introduces the relevant geographical, economic, educational, political, library and Information Communications Technology (ICT) developments. The geographical background is given to demonstrate the demography of its people such as their level of literacy, the rural-urban dynamics and the distribution of doctors in relation to where the people are. The economic background is given to show how Malawi is largely a poor country with a very low gross domestic product (GDP) that depends on a fragile agrarian economy. This is then followed by a description of the relationship between the economic and the health environment which shows how the Malawi health budget is not adequately supported and how these results in failure to support EBM and the information resources it requires. The chapter also gives the political background of Malawi to show how Malawi was for a long time a closed society under an autocratic rule and how that negatively impacted on the information institutions such as libraries and ICTs. The chapter analyses the promise brought by the advent of multiparty politics and freedom of information, how Malawi opened up and how she is now technologically developing. The conclusion questions whether the economic and historical challenges would be barriers to the information seeking behaviour of the doctor or whether the promise of the ICTs would activate better information seeking practices among the doctors.

### 2.2 GEOGRAPHICAL BACKGROUND OF MALAWI

Malawi is a small developing country in Central Southern Africa. It has an area of 120,000 square kilometres (sq. kms) of which about 25,000 sq. kms is water. It lies in the Great East African rift valley which also contains the 580 km long Lake Malawi to the East of the country (See Figure 2.1 on page 45 for Map of Malawi). Malawi Health Policy Project (2017) reports that Malawi has a population of 18 million people and 35% of these are illiterate while 80% live in the rural areas. The major urban centres are; Lilongwe in the Central Region, which is the capital city of the country with a population of 1.1 million, Blantyre in the Southern region with a population of 850,000, Zomba again in the Southern region with a population of 100,000 and Mzuzu in the Northern region with a population of 140,000 (Malawi National Statistical Office, 2012b). Doctors are largely clustered in these urban centres in Malawi with Lilongwe and Blantyre, together with its surrounding districts, forming the largest clusters of 400 doctors out of a total of 600 doctors in the country

(Medical Council of Malawi, 2015). The implication of this is that the doctor to patient ratio worsens the further one moves away from urban centres to the rural areas. Other studies have noted that the implementation of evidence-based medicine especially in rural areas can be more challenging because of poor doctor to patient ratio (Babu, 2008; Hisham *et al.*, 2016a).

### **2.3 MALAWI'S ECONOMY**

Structurally, Malawi is an agro-based economy with very minimal manufacturing and a small middle class. Agriculture accounts for more than 80% of all Malawi's export earnings, it is the main source of livelihood for 90% of the country's total population and constitutes the predominant economic activity for almost half of poor households, particularly in rural areas (Malawi National Statistical Office, 2012a)<sup>2</sup>. The dependence on agriculture has caused the government to focus on integrated rural production, diversification in light industry, particularly agro-processing and import substitution, and improved transportation facilities, (Malawi National Statistical Office, 2012b). The small middle class does not own factories but depends on trade of agriculture products, imported consumer goods or government services or foreign donor funding projects (Cammack, 2009). The export base has not grown although there are new prospects of mining. Macroeconomic performance has shown a steady progress since 2005. Real GDP grew from 2.1% in 2005 to 7.4% in 2007, 9.7% in 2008 and 7.6% in 2009 (Cammack, 2009). By 2014, Malawi's economy continued on the path to recovery in the aftermath of the economic crisis of 2012, which saw a contraction in real gross domestic product (GDP) growth to 2.1% (African Development Bank, 2015). Real GDP growth in 2014 was estimated to be 5.7%, driven largely by agriculture, but with significant contributions from manufacturing, wholesale and retail trade, and services (African Development Bank, 2015). The GDP grew slowly in 2015 to 5.5% following the late arrival of rains and the severe floods experienced in January 2015, which damaged crops and infrastructure. This slow growth continued in 2016 and was projected at 5.7% and this projection was dependent on improved investor confidence, favourable weather conditions, higher agricultural exports, lower inflation and moderate interest rates (African Development Bank, 2015).

Prior to 2011 40% of Malawi's development was financed by donors. Since independence, Malawi has enjoyed good relations with the donor community notably the United States of America (USA), the United Kingdom (UK), Germany and the rest of the European Union (EU) countries (Africa Economic Outlook, 2015). Over the years, other partners such as

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<sup>2</sup> This is the latest Malawi National Statistical Office Integrated Household Survey in circulation and its details are accounted for in the references



Norway, Ireland, China, Brazil, India and Japan took growing interest in Malawi with increased financial and material contributions. However, the late President Bingu wa Mutharika's poor management of foreign policy ruined relations with the major donor countries that led to withdrawal of aid in 2011/12 (Africa Economic Outlook, 2015). Donor aid resumed after Mutharika's death and Joyce Banda became president but direct budgetary support to government was withdrawn again in 2013 as a consequence of massive corruption popularly known as Cash-gate. Even after the current government of Peter Mutharika took power after the elections in 2014, donors still withheld the budgetary support to this day resulting in the deterioration of fiscal conditions. The fiscal deficit widened to 4.3% in 2013/14 from 0.2% in 2012/13, resulting in higher than programmed domestic financing, exerting pressure on interest rates (Africa Economic Outlook, 2015). Inflation in 2014 remained in double digits (24.1%) as the kwacha continued to depreciate, especially during the lean tobacco season and in the absence of donor budgetary support (Africa Economic Outlook, 2015). Since 2012, economic shocks such as devaluation of the Kwacha by 49% and inflation of more than 20% contributed to high living costs, with Malawi being ranked as the 13th worst performing economy in the 2014/15 Global Competitiveness report (World Food Programme, 2015). Malawi's funding gaps and vulnerability became even more pronounced in early 2015 as floods hit the country, particularly the southern part of the country. Weak support from donors, who suspended direct budgetary support to the government following the Cash-gate scandal continued to weigh on economic growth and implementation of public service delivery programmes in 2015 and onwards.

## **2.4 HEALTH AND THE NATIONAL ECONOMY**

On the macro level, the economic strain on the national budget forced Malawi to consistently disburse and spend less than 15% of the national budget to the health sector (Malawi Health Equity Network, 2011). Malawi Health Policy Project (2017) reports that financial resources for the health sector in Malawi are not always adequate. For example, in 2015, although the total health budget as a percentage of the government budget was at 16.1%, the government's health expenditure as a percentage of the general government expenditure remained at 6.2%. World Health Organisation (WHO) (2017) reports that the average allocation of African governments to health expenditure is 9% which is far below the recommendation of the Abuja Declaration which asked African governments to allocate a minimum of 15% of their total budget to health. The implication of the Abuja declaration is that the government health expenditure as a percentage of the general government expenditure must also never be less than 15%. The extent to which low health expenditure in Malawi affects the implementation

of EBM, creation of good information infrastructures and information resources in hospitals that could facilitate good information behaviour for the doctor is of interest to this study because previous studies in other contexts have shown that economic factors do matter.

The Malawi Government through the Malawi Growth Development Strategy seeks to support the health of its population so that it should in turn strengthen the national economy through vibrant micro-economic activities (Malawi Ministry of Economic Planning, 2017). Such an ambitious plan by the government is derailed by that fact that on the whole; poor child health, infectious diseases e.g. tuberculosis, malaria and HIV and AIDS are the three top most killers and they compound the disease burden on the nation (WHO, 2017). The Malawi Ministry of Health (2010) reports that one of the best ways that can help it to curb the enormous disease burden is through more than just a good health budgetary allocation but rather through the actual disbursing of the allocated funds so as to facilitate a good health expenditure and a good human resource force that takes care of the doctor to patient ratio. The poor economic performance is failing to contain both the disease burden and sustenance of implementation of a favourable budget, supply of adequate drugs and absorb of the graduating health professionals at all levels (The [Malawi] Health Policy Project, 2017).

## **2.5 MAJOR PROVIDERS OF HEALTH SERVICES IN MALAWI**

The Ministry of Health is the major provider of health services in Malawi which provides about 60% of the healthcare services (Malawi Ministry of Health, 2017). The Christian Hospital Association of Malawi (CHAM), which is an umbrella organisation of Christian-owned health facilities, owns 29% of the healthcare facilities. The Ministry of Local Government provides 5% of all healthcare services, mainly health centres and maternity clinics. The remaining 6% is shared by NGOs such as Banja la Mtsogolo, Malawi AIDS Counselling Resource Organisation (MACRO) and other private practitioners (Malawi Ministry of Health, 2017).

## **2.6 HOSPITAL STRUCTURES IN MALAWI**

Malawi Health Policy Project, (2017) and Lavy *et al.* (2007) report that there are a total of 21 district hospitals in Malawi which are found in most of the 28 administrative districts besides the main central hospitals that are found in the four main urban areas, namely Blantyre, Zomba, Lilongwe and Mzuzu. The number of district hospitals (21) as a ratio of the national population (18,000,000) reveals there is an average of 860,000 people for each hospital and this is a big strain on a health facility and health workers who include doctors (Malawi Health

Policy Project, 2017). The Malawian population which is dominantly rural and lives on less than US\$1 per day depends on free health services and this puts a strain on the budget of any public hospital and its efforts to establish infrastructure that could support EBM (Malawi Ministry of Health, 2017).

Malawi would best be described as being in the early stages of EBM implementation as it does not have a locally generated national EBM database that is accessible to doctors at the point of care in various hospitals (World Health Organisation [WHO], 2017). Most hospitals in Malawi lack access to Health Internetwork for Research Initiative (HINARI) databases which are provided by the Research4Life (Research for Life) project but are made accessible to all health institutions in Malawi for free by the World Health Organisation (WHO) (Masanjika, 2010). Masanjika (2010) reports that the major barriers of access to HINARI database by the hospitals in Malawi include poor libraries; lack of awareness of HINARI due to lack of publicity by those who register it, poor information infrastructure, poor budgets, lack of space and lack of training in information retrieval. The poor information infrastructure threatens the satisfaction of the information needs of the doctors because studies show that access to online resources fosters the satisfaction of information needs and the will to improve search skills (Kourouthanassis *et al.*, 2015).

The government hospitals by design were supposed to have hospital libraries but these are either not functioning in 90% of the hospitals or are very poorly stocked with out-dated and irrelevant books (American Peace Corps, 1989). Further, 95% of the hospitals and their libraries do not subscribe to any health or medical journals or EBM databases which could be of help at the point of care (Malawi Ministry of Health, 2010). The World Health Organisation promotes access to medical resources in order to enhance the evidence-based practice but these are not adequately utilised as very few staff access them (WHO, 2017). The hospital libraries also do not have EBM books such as those by Mackay (2015) and Woodward-Kron, Fraser, Pill and Flynn (2015) which highlight 50 studies every doctor should know in a particular discipline. Thus, the public hospital libraries in Malawi do not provide a favourable atmosphere for the development of skills for exploitation of open access resources by doctors.

## **2.7 HEALTH HUMAN RESOURCES**

Malawi Ministry of Health (2017) and Malawi Health Policy Project (2017) report that only 75% of the health workers' positions in the Ministry of Health in Malawi are filled at any given time which culminates into 25% of established posts being vacant. WHO (2017)

reports that the human resources remain a challenge in Malawi and that this is worsened by the fact that the few human resources available are clustered in the urban areas. As a demonstration of the strain that this has on the doctors Lavy *et al.* (2007), report that there were only 15 trained surgeons of any specialty in Malawi and there was none stationed at any of the (rural) district hospitals. Lavy *et al.* (2007) further state that most district hospitals (commonly known as district health centres), have one doctor who is recruited straight from internship and serves as the district health officer. Apart from overseeing the clinical work, the district hospital doctors also carry out other administrative duties. This makes them to be very busy so much so that part of the clinical work is shared with clinical officers who are paramedic clinicians with four years of practically orientated training (Lavy *et al.*, 2007). The challenge of such human resource problems in the Malawian health sector is a problem that brings about critical negative effects on its efforts to render the essential health package while keeping abreast with modern health delivery paradigms such as evidence-based medicine (WHO, 2017). WHO (2017) further observes that although an increase in the health workforce was achieved through the implementation of the 6-year Emergency Human Resources Plan (2005-2010), the human resource challenge still remains and government still fails to absorb all the health workers coming out of the training institutions. This creates a situation where the doctor patient ratio is very critical. At the time of the study the ratio was at 1 doctor to 60,000 patients which is worse than the recommended ratio of 1 doctor to 25,000 (Malawi Ministry of Health, 2017; Malawi National Statistical Office, 2012a).

## **2.8 EDUCATION**

The context of medical education in Malawi can be best understood if one reviews the history of formal education against the backdrop of indigenous knowledge systems and its informal education, early missionary work and colonialism. While informal education was embedded in the indigenous knowledge systems, formal education like reading and writing and use of libraries was introduced to Malawi by early missionaries (Plumbe, 1987).

### **2.8.1 Informal education**

Prior to the early missionary work, Malawi was and still is largely an oral society that depends on informal education. Anderson and Matthews (2010) observe that Malawi is culturally and economically representative of many sub-Saharan African countries where the indigenous knowledge systems are very central to society and they hinge on oral tradition for information transfer and informal education. Anderson and Matthews (2010) further observe that the oral tradition is regarded as the informal school that informs, educates and entertains Malawians of all ages. In the oral society, tradition is passed on from the old to the young and

the question of reading and writing does not arise (Anderson & Matthews, 2010). The overdependence on such informal educational systems to this day accounts for the high levels of illiteracy in Malawi which is pegged at 42% (Malawi National Statistical Office, 2012b). The high rate of illiteracy connotes that many patients can neither reliably inform the doctors during diagnosis nor access health information on their own through reading, writing and use of technology. The question of major interest here is to what extent would the oral nature of the Malawian society influence the doctor's preference for human sources of information as opposed to printed and electronic resources? This question is worth noting although it is not part of the research questions of this study.

### **2.8.2 Formal education**

Formal education was introduced in Malawi with the coming of the white Christian missionaries in the late 1800s. The missionaries introduced schools to enable the locals to read and write so that they could read the Bible and subsequently become local evangelists (McCracken, 2012). However, with about 200 years of missionary and government education to date, 42% of the population in Malawi still remains uneducated and illiterate (Malawi National Statistical Office, 2012). The number of graduates (n=27,800) as a percentage of the total population of all the people who are five years old and above (n=8,271,400) is only 3% (Malawi National Statistical Office, 2012b). The number of people that have gone through the formal education has a direct bearing on the number of people that are trained to work as health professionals in general and specifically as doctors.

### **2.8.3 Medical education**

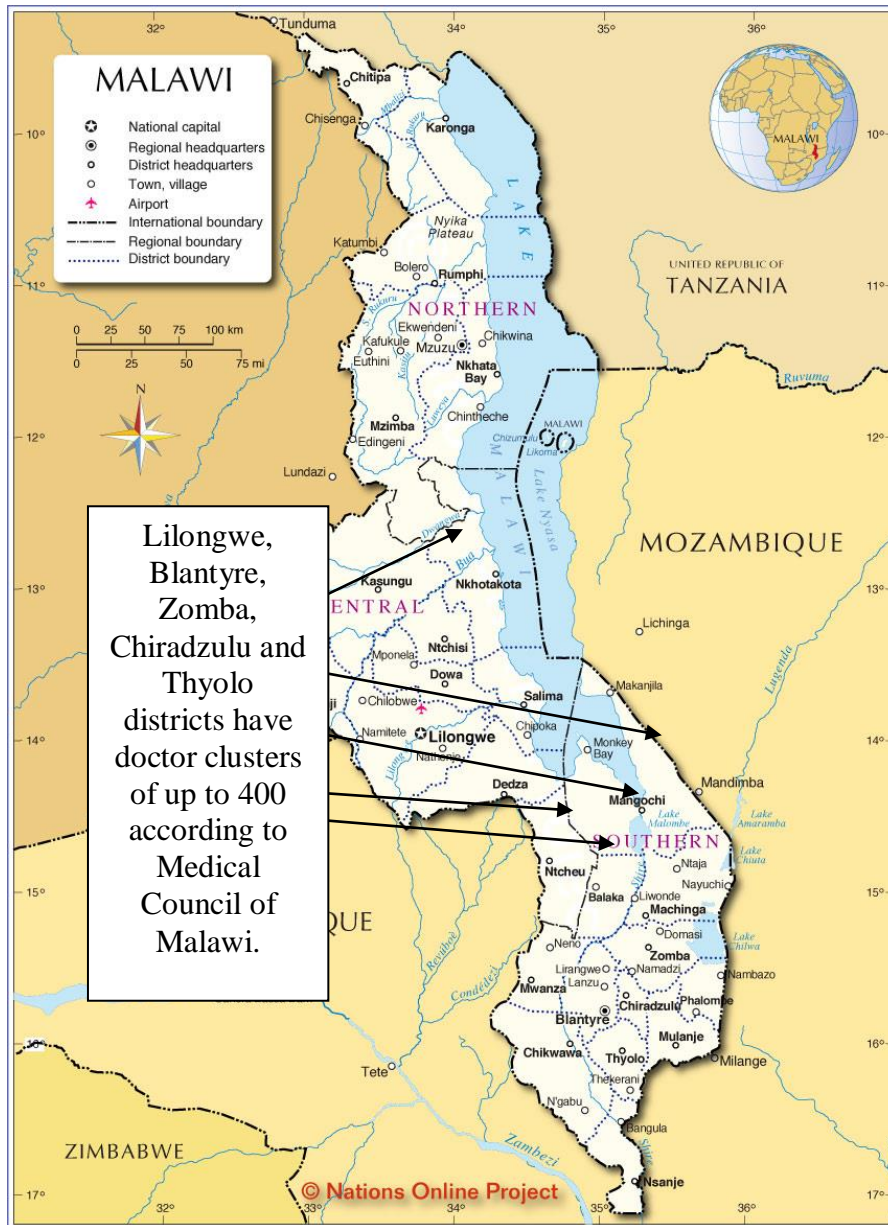
The establishment of the College of Medicine of the University of Malawi in 1991 came as a consolation to the health profession whose objective was to ease the doctor to patient ratio besides facilitating a vibrant medical and health research culture (Mulwafu & Muula, 2001). By 2016, the College of Medicine had trained 600 doctors, most of whom have been retained in Malawi. An example of the impact of such retention is the fact that the four districts that were targeted by this study i.e. Blantyre, Chiradzulu, Thyolo, Zomba and Lilongwe had a total cluster of 400 doctors at the time of the research (Medical Council of Malawi (MCM), 2015). The location of Blantyre, Chiradzulu, Thyolo, Zomba and Lilongwe districts in relation to the map of Malawi is shown in Figure 2.1 (Page 30).

The College of Medicine is aware that mere numbers of doctors are not enough and as such it is committed to ensuring that medical research is an essential and integral part in the training of health professionals such as doctors (University of Malawi, College of Medicine, 2017).

Doctors, nurses and other health professionals should be able to critique and explore new methods of treatment and disease control using evidence-based methods (University of Malawi, College of Medicine, 2017). The College has good research, library and ICT policies that seek to make the medical student an independent learner and one that is active in a problem based learning atmosphere (Chiweza, 2017; Gremu, 2017). The research and information literacy courses offered at the college have the potential to make the medical students develop good information seeking behaviour skills (Chiweza, 2017; Gremu, 2017). However, the extent to which the doctors put to use the research and information literacy skills they gain from the College of Medicine during their training years remains to be seen. Studies such as Masanjika (2010) and Muula *et al.* (2003), observe that health professionals, who include doctors, have challenges accessing information to assist them in their continuing professional development in their working places.

Historically, both the delay of the introduction of the medical education and the information access challenges can be appreciated if one understands the political history of Malawi. The College of Medicine came on the scene after more than 200 years of colonial rule and after 30 years of self-government rule in Malawi. The first missionary arrived in Malawi in 1859 and Malawi was declared a British protectorate in 1891 and she gained her independence in 1964 after winning self-government elections in 1961 (Phiri, 2004). Thus an understanding of the political history of Malawi could also help one to appreciate the delay of medical education and why Malawi had a closed information culture i.e. where there was no freedom of information.

**Figure 2.1 Map of Malawi showing districts with highest clusters of doctors**



Source: <http://www.nationsonline.org/oneworld/map/malawi-administrative-map.htm><sup>3</sup>

<sup>3</sup> Nationsonline.org permits free use of its resources for education purposes.

## **2.9 POLITICAL HISTORY AND INFORMATION BEHAVIOUR**

The political history is presented here to demonstrate how despotic rule created a cult around the first president who was a doctor to the extent that it was believed in the first republic of Malawi that there was no one who could be equal to him (Lwanda, 2009). Lwanda (2009) also argues that many doctors from Malawi practised outside Malawi not only for economic reasons but also for political reasons. The net effect of the *brain-drain* whether for economic or political reasons was a poor doctor to population ratio that could not adequately bear the disease burden.

Sindima (2003) identifies seven political epochs in Malawi, formerly called British Central Africa 1859 to 1959, Nyasaland from 1953 to 1964 and Malawi from 1964 to the present. The first political epoch in Malawi is the pre-1850s. The dominant features of this period were, development of general trade, slave trade, and the arrival of British missionaries. The second epoch is the 1850 to 1889 period when more missionaries were followed by colonial consolidation and for the first time issues of land and taxes created animosities between the locals and the new settlers. Dr Robert Laws, a Scottish missionary established the first library in Malawi during this epoch (Plumbe, 1987). Libraries were later established in different political epochs by missionaries and the colonial government and these served the white minority including the few colonial doctors as their sources of information for both their professional and leisure activities (Mkandawire, 1998). See Table 2.1 which shows the evolution of information holding centres (libraries) in Malawi. The indigenous Malawians were engulfed in their indigenous knowledge systems which depend on oral tradition. The missionaries' challenge was therefore to get the indigenous Malawians into formal education where they could read and write after which they could use the libraries (McCracken, 2012).

Sindima (2003) suggests that the third political epoch in Malawi is 1890 to 1904. The dominant feature of this era was the declaration of Malawi, then called Nyasaland, as a British protectorate which was called British Central Africa in 1891. The fourth epoch is 1905 to 1945 which marked the emergence of the first Malawian doctor, Dr Malikebu. Lwanda (2007) alleges that the white minority government had a policy which could not allow a Malawian (or a Nyasa as they were then called) to practice medicine anywhere in Malawi even if they had the qualifications. This explained why Dr Malikebu and Dr Hastings Kamuzu Banda, the second Malawian doctor emerging from this era, practiced medicine outside Malawi long after their medical qualifications (Lwanda, 2009). The fourth political epoch also saw the remarkable rise of political consciousness of Malawians that led to the formation of the first black political party, the Nyasaland African Congress (NAC). This was



an era that also saw the advent of black missionaries and their mission centres and indigenous formal schools most of which never took their students beyond the junior primary school. The fifth political epoch, 1946 to 1960, saw the formation of the Federation of Rhodesia and Nyasaland. There was a rise in anti-colonial sentiments in this era that led to a state of emergency and the banning of the Nyasaland African Congress and later the formation of the Malawi Congress Party. The sixth political epoch extended from 1961 to 1993, and saw the introduction of the general elections, self-government, independence, the first Republic, one party rule, and autocracy and the muzzling of freedom. The University of Malawi Library System, which was to birth the two biggest medical and health libraries in the name of Kamuzu College of Nursing Libraries in 1975 and College of Medicine Library in 1991, was established in the sixth epoch, as shown in Table 2.1. Both College of Medicine Library and Kamuzu College of Nursing Library were instrumental in the provision of medical and health information in both the electronic and hardcopy environments. The two libraries also act as the main reference libraries in health and medicine and they have more stock than all hospital libraries in Malawi put together. However, autocratic rule in this sixth political epoch was to eclipse the potential of many information holding centres like libraries. Lwanda (2009) argues that despite promise of independence and despite the fact that the first president, Dr Hastings Banda, was himself a doctor, the bliss of self-rule was to be short lived as the first president cum doctor reverted to autocratic rule. The seventh epoch is the advent of the multiparty politics in 1994 in Malawi which saw a new constitution that safe-guarded freedom of expression and speech and freedom of information thereby opening up the information and communication landscape (Sindima, 2003). The subsequent sections present the details of the autocratic rule of the sixth political epoch and how it significantly froze the information behaviour of all Malawians.

**Table 2.1 Evolution of libraries in Malawi (Formerly British Central Africa and Nyasaland)**

<b>Name of the Library</b>	<b>Year established</b>	<b>Established by</b>
Church of Scotland Mission	1865	Scottish Missionaries
Zomba Administration Library	1895	British Government
Zomba Agricultural Library	1899	British Government
Forestry and Game Library	1924	British Government
The Secretariat Library	1930	British Government
Kachebere Seminary Library	1939	Catholic Missionaries
Blantyre Secondary School Library	1940	Scottish Missionaries
Zomba Catholic Secondary. School. Library	1942	Catholic Missionaries
Nyasaland Society Library	1946	British Government
The National Archives Library	1947	British Government
Dedza Secondary School Library	1951	British Government
British Council Library	1951	British Council
American Library	1961	American Government
University of Malawi Libraries	1965	Malawi Government
Kamuzu College of Nursing Library	1975	Malawi Government
College of Medicine Library	1991	Malawi Government

Table 2.1 is adapted from Msiska (2002) and Plumbe (1987).

## **2.10 AUTOCRACY AND INFORMATION BEHAVIOUR**

The First Republic of Malawi which is referred to as the sixth political epoch was an era in which the basic forms of human rights were violated. Information content was heavily censored, banned, and destroyed under the pretext of curbing subversive materials (Lwanda, 2009). The muzzling of freedom of information and freedom of expression, it is argued, had a direct influence on inducing very poor information practices (Lwanda, 2009). Malawi steadily progressed to autocracy right from its independence, and the subsequent paragraphs present some of the landmarks on the path to autocratic government and how they influenced poor information practices among Malawians.

### **2.10.1 First general elections**

The Malawi Congress Party (MCP) was elected to power in the 1961 general elections through a popular vote. The 1961 elections were to mark MCP's first political milestone.

Other political milestones that were to shape Malawi's political history were: self-government in 1963, independence in 1964, the cabinet crisis in 1964, the republic in 1966, and the establishment of one party rule and life presidency in 1971. Although the 1961 elections had allowed for political pluralism, the multiparty system was to be short lived due to a political crisis that was looming (Mtewa, 1986).

### **2.10.2 Cabinet crisis**

In 1964, a cabinet crisis became a political watershed for Malawi. A clique of young cabinet ministers disagreed with the then new president, Dr Hastings Banda. The official explanation, among others, was that the young ministers had communist inclinations and they wanted to topple Dr Banda who favoured a capitalist style of government (Banda, 1964). The rebelling ministers accused the President of being autocratic and delaying what was commonly known as the africanisation process in the senior ranks of the public sector besides denying aid offers from the then Eastern Bloc countries including Communist China (Chiume, 1982). It later became more than just a parliamentary debate as the dissenting cabinet ministers were forced to flee into exile as charges of treason were raised against them. The rebels as Dr Banda and his supporters called them, were either to die in exile or were not to return to Malawi until after 1993. Despite this, Dr Banda won the sympathy of the West because of his strong anti-communist rhetoric (Banda, 1964). While he won the favour of the West, his grip on the small African country tightened and severe curtailment of political freedom followed as his governing party hunted down sympathisers of the exiled rebel ministers (Mtewa, 1986).

### **2.10.3 Freedom suppressed**

The MCP government used various strategies to suppress dissenting elements in Malawi. The strategies not only denied many Malawians their basic freedoms but also negatively affected the performance of libraries and information holding centres. Mtewa (1986), Lwanda (2009) and Sindima (2003) state that there were five main strategies that the first republic in Malawi used to muzzle the basic freedoms including freedom of information. Firstly, the MCP government used its paramilitary force in the name of Malawi Young Pioneers. This paramilitary wing worked together with the Youth Leaguers of the party. The paramilitary wing had power to access and destroy any information items it considered subversive from any information holding centre. Secondly, the MCP government enforced the establishment of a one party state. The kind of witch-hunting described above enhanced the MCP as the party of government while killing other parties and also muzzling freedom of information, expression and association. Constitutional proposals for the establishment of the one party state were tabled as early as 1965 but they were not to be implemented until 1971. Thirdly,

the MCP government declared the then ruling president Dr Hastings Kamuzu Banda to be the life president. This consolidated the position of the President as the only authority, whose word became policy. There was no separation of powers between the executive, the judiciary, and the legislature. Fourthly, as a result of the absolute autocracy, the government established draconian laws and this was done through changing the constitution, the penal code and many other laws to suit the tight control on the nation. The most notorious change was the Republic of Malawi Preventive Detention Order's Penal Code (Section 60 A). This section vaguely said that, "any person who by any means communicated or attempted to communicate, to any person outside Malawi any false statement, information, report, or rumour which would likely be published or broadcast, either in the form or language in which he or she communicated to the public generally in some place outside Malawi or to any section or such public, should be guilty of offence if such publication or broadcast might reasonably be expected to be harmful to the interests or the good of Malawi". Any person who committed an offence against this section was liable to imprisonment for life. As a result of this law, many information items in library and information centres were destroyed or simply put under lock and key. This kind of penal code created a culture of silence among Malawians and with it Malawians were not keen on establishing vibrant information seeking behaviour. The extent to which this was the case for Malawian doctors is reflected through the life of Dr. Lwanda (a medical practitioner) who together with many other doctors had to migrate to the West on political grounds as they feared for their lives (Lwanda, 2009). The fifth and last strategy of the government was to create the National Censorship Board which was used to prevent the importation of 'subversive' information to the country. To demonstrate the impact of the National Censorship Board, between 1st August, 1968 and 31st May, 1985 there were about 1000 banned titles that were listed in 'The Malawi Government's Catalogue of Banned Publication, Cinematograph Pictures and Records.' Many of the banned materials were of academic excellence and their being banned denied scholars and researchers in Malawi their academic freedom. The rights of libraries to build collections and access information were limited by the often politically motivated National Censorship Board.

The government assumed very tight control over media and information agencies such as the Malawi Broadcasting Corporation, the Department of Information, the University of Malawi Libraries, the National Library, the National Archives and the country's only two government owned newspapers then, The Daily Times, a daily newspaper, and Malawi News, a weekly newspaper. All journals and books that were being imported into Malawi had to be reviewed by the Censorship Board and this did not spare medical journals and medical books. Fear of the political authorities often limited the freedom and potential of information centres as

many librarians engaged in self-censorship. Tight control on information also meant that there was no television, Internet or email in the first republic. The despotic political deterred potential investors in the information industries despite the fact that towards the end of the eighties, the world was already moving from the manufacturing based economy to the information-based economy. While libraries and information centres in most other countries were enhancing information access, Malawi remained completely closed. Chiweza (2008) reports in a survey on the degree of freedom of information in multi-party Malawi's libraries and documentation centres that fear and frigid use of information had a big negative impact on the information holding centres that was observable a few years into the multi-party era.

## **2.11 MULTIPARTY POLITICS AND INFORMATION BEHAVIOUR**

In 1993, a national referendum was held in Malawi at which people voted as to whether they wanted to continue with the single party government or move to a multi-party democracy (Phiri & Ross, 1998). This referendum was influenced by global changes taking place because of the end of the cold war, the emergence of multiparty democracies in Eastern Europe and other African nations, and the withholding of aid by donors that resulted in stringing of aid to good governance (Phiri & Ross, 1998). Malawians voted for a multiparty political system in the referendum in 1993. In 1994, multiparty general elections were held and the United Democratic Front (UDF) formed government under President Bakili Muluzi. Englund (2002) observes that the advent of multi-party democracy was also the start of a new chapter for information services in Malawi. Several landmark changes were made which were to promote information access and these included the new constitution for the Republic of Malawi that now had articles for upholding freedom of information and freedom of expression. The Malawi Government (2002) indicates in chapter 4, section 33 to 37 of its republican constitution that; "Every person has the right to freedom of conscience, religion, belief and to academic freedom. Every person shall have the right to freedom of opinion, including the right to hold opinions without interference to hold, receive and impart opinions. The press shall have the right to report and publish freely, within Malawi and abroad, and to be accorded the full access to public information." The same section of the Republic of Malawi Constitution also states that, "Subject to an Act of Parliament, every person shall have the right of access to all information held by the state or any of its organs at any level of Government in so far as such information is required for the exercise of his rights." These tenets of the constitution were significant to the development of the current information access paradigm in Malawi and they offer the doctors a favourable environment for their

information practices. The subsequent paragraphs outline the major advances on the information landscape of Malawi in the multiparty era.

The Malawi Government Communications Act was established in November 1998, four years after the advent of multiparty (Malawi Ministry of Information, 1998). It states that “An Act to make provision for the regulation and provision of services in the Communications Sector in Malawi comprising telecommunications, posts, and broadcasting; for the establishment of an independent regulatory authority, the Malawi Communications Regulatory Authority; for the separation of the administration and provision of telecommunication services from postal services; for the reconstitution of the Malawi Broadcasting Corporation (MBC) as a public broadcaster; and for matters connected therewith or ancillary thereto” (Malawi Ministry of Information, 1998). Through this act, Malawi was opened up to investors in the information industry who had the potential to provide ICT and Internet services which in turn would enhance the potential for the information seeking behaviour of the doctors. It was therefore no surprise that the first Internet Service Provider in Malawi emerged in 1998 while the first television station was established in 1999 (University of Malawi, Central Library Services, 2000). The Internet was to give the University of Malawi institutions such as the College of Medicine critical access to electronic full text scholarly databases. The change in the information landscape of College of Medicine of the University of Malawi had the potential to positively impact on the information practices of medical students and medical faculty staff (Mawindo, 2006).

A further change in the information environment was registered in Malawi in 1998 through the countrywide consultative workshops that sought to redefine the role of the National Censorship Board in a multiparty democracy (Malawi National Censorship Board, 1998). The National Censorship Board’s new role was to ensure that institutions in the information services had more liberty to achieve their mission of providing for information needs of society without undue hindrance by the state. It was only after structures that inhibited freedom of information were demolished that the library and information services in Malawi became fully influenced by the world trends in library and information science. For example, major milestones in library and information services in Malawi only began in 1994 when librarians in Malawi hosted a regional conference that for the first time discussed freedom of information inside Malawi (Malewezi, 1994). In 1994, the University of Malawi established UnimaNet, an email service provider under the sponsorship of United Nations Development Programme (UNDP) (University of Malawi, Chancellor College, 1995). In 1994, University of Malawi Library System, which is one of the biggest networks of libraries in Malawi,

embarked on an automation project with sponsorship from the Rockefeller Foundation and this was to foster more access to electronic medical resources in the College of Medicine of the University of Malawi (Mwiyeriwa, 1996). In 1995, the Second Republic's constitution was formally effected and it included a section that clearly protected freedom of information and freedom of access to information (Malawi Government, 2002). In 1996, the library fraternity in Malawi drafted a national policy on libraries and documentation centres that also safeguarded freedom of access to information and this policy was revised in its draft format in 2012 (Malawi National Commission for Science and Technology, 2012). In 1998, the first commercial Internet Service provider, MalawiNet, was established. In 1999, a workshop was held calling on the government and stakeholders to draft a national policy for ICT with the help of United Nations Economic Commission for Africa (UNECA). In 2008, the Malawi Government signed the New Partnership for African Development (NEPAD)'s ICT protocol in Kigali, Rwanda which is commonly called the Kigali Protocol (Malawi Ministry of Information, 2008). This protocol seeks to network as much of Africa as possible. In 2006, Malawi developed a growth strategy for development commonly called the Malawi Growth Development Strategy (MGDS) which gives priority to both health and ICT (Malawi Ministry of Finance, 2006). In 2006, the Health Information Systems Policy was adopted by the Malawi Government (Malawi Ministry of Health, 2007).

## **2.12 CHANGES TO THE INFORMATION ENVIRONMENT**

Looking at the above national information structures and national milestones, one expects the doctors to be part of a big information revolution in Malawi. Malawi Communications Regulatory Authority (MACRA) (2012), reports that Malawi has made a big leap in the ICT infrastructure. As a demonstration, Malawi Communications Regulatory Authority (2012) reports that Malawi has moved from 1 radio broadcaster in 1992 to 25 licensed radio stations in 2012; from no Internet service provider prior to 1998 to 15 competitive Internet service providers in 2012, from no television station prior to 1999 to 15 licensed television service providers in 2012; from no mobile phone operator prior to 1999 to 7 licensed mobile phone operators in 2012 with Airtel Malawi as the leader. Airtel Malawi (2012) in its jingle monitored on all radio and TV stations in Malawi sees the current information environment in Malawi as a springboard for a bigger information revolution which has a positive impact on the information behaviour of everyone including the doctor and the patient. Airtel Malawi (2012) specifically reports that the information landscape in Malawi has generally advanced and specifically Airtel's 3G network has the capacity to connect Malawians to the remotest areas of the country. Airtel Malawi (2012) insinuates that anything is now possible on its

network in Malawi including access to electronic information by medical consultants to and from their patients in both urban and remote areas. The implication of Airtel Malawi's claim is that the doctors also have the opportunity to link up with anyone they want through the mobile phone voice calls or short messaging systems or the mobile Internet services and indeed through the social web. Mawindo (2006) observes that it is one thing to have a sound electronic information structure and yet another thing to be able to effectively use the same. Mawindo (2006), in a survey that sought to explore the use of electronic resources versus the use of hardcopy items, found that medical students from the University of Malawi College of Medicine preferred hardcopy items as reference materials for their research and learning despite the availability of a sound electronic infrastructure and electronic journal databases. While Mawindo (2006) implies in her report that such preference for hardcopy items by medical students is bound to continue in the practicing years, this study was interested in finding out whether indeed the information seeking behaviour of doctors exploits the potential of mobile networks as suggested by Airtel Malawi among other things.

### **2.13 NET EFFECT ON DOCTORS**

The chapter finishes by only speculating on what would be the net effect of a context such as Malawi on the doctors? This question is asked because the country in which doctors practice plays a big role in the determination of their information behaviour in their clinical environment (Davies, 2007). For instance, the local clinical environment can be described in terms of; the availability of information resources and the workload, the doctor to patient ratio and the quality of information infrastructure network besides the ingenuity of the doctors in research and evidence-based medicine (Hisham *et al.*, 2016a; Babu, 2008; Lwanda, 2007). Babu (2008) observes, as an example, that the environment in which doctors work in most developing countries negatively influences their capability to engage in research, EBM and vibrant information behaviour. Babu (2008) and Hisham *et al.* (2016a) insinuate that implementation of evidence-based medicine in developing countries and more especially in rural areas should therefore be more challenging. While this is not a comparative study, it observes that any comparison of differing societies, or search for causal relationships in any sphere of their social activities, must derive from a clear understanding of the premises from which the comparison is being made (Kotei, 2003). This means, in part, that the basic characteristics of the societies concerned must be clearly understood such as the economic, political, educational, ICT, health and sociological factors that brought such institutions into being and continue to give them the *modus vivendi* (Kotei, 2003).



## **2.14 CONCLUSION**

This chapter has demonstrated that the Malawian context sets both challenges and opportunities for EBM related information behaviour of doctors. The challenges include the economic hardships that the country is faced with. The chapter has shown that economic hardships do not proffer the development of an effective information landscape due to poor government financing of the health sector. The poor economy also negatively affects the poor and vulnerable groups by increasing the disease burden which puts pressure on doctors in public hospitals. Another challenge discussed is that Malawi is presented as a country with high illiteracy levels which could be a threat to the definition of information needs of doctors as they ask patients questions during diagnosis. A salient issue with regard to education and service delivery is that Malawi has few trained doctors that do not adequately cope with the immensity of the disease burden on the rural population as many doctors are clustered in the urban centres. The discussion of political history of Malawi has shown that it facilitated paralysis as far as freedom of access to information is concerned and it also contributed to the poor development of information centres and poor information practices of Malawians.

The chapter has also shown that despite the challenges, some opportunities exist that provide a potential environment for a big information revolution even for doctors. In particular the shift from autocratic rule to a multi-party democracy, the introduction of a new republican constitution that safeguards freedom of access to information and the restructuring of the censorship board. In the same manner the introduction of a Communications Policy and Act in 1998 has liberalised the telecommunications industry and, allowed the proliferation of a variety of mobile and other service providers to introduce various information access technologies and services. The key question however remains; to what extent are these opportunities being utilised to overcome the very challenges that have been a challenge for Malawi for so long in order to improve the information behaviour of doctors in Malawi and the implementation of evidence-based medicine. Chapter 3 therefore discusses evidence-based medicine.

### 3.1 INTRODUCTION

This chapter gives a historical perspective of the definition of EBM and through it demonstrates how EBM has all along been projected as an activating mechanism for the information behaviour of doctors. The chapter reports on the efforts being made in EBM modelling and the debates related to EBM modelling. This chapter does not so much dwell on philosophical and ethical debates about EBM. Rather, it examines EBM as an activating mechanism that enhances the information seeking behaviour activities of doctors, the challenges that are encountered and the intervening variables that are observed or proposed. Thus the chapter discusses two EBM models and how they are linked to the information behaviour practices of the doctors within the EBM paradigm. It also discusses empirical evidence on EBM and doctors from both developed and developing countries in order to draw lessons on the circumstances under which EBM is possible for doctors. The chapter concludes with a proposition that connects the EBM paradigm and the models of information behaviour.

### 3.2 CONCEPTUALISING EBM

There are various definitions of EBM that demonstrate that the information behaviour practices of doctors has historically been a constant aspect of EBM from the early days to the present as demonstrated through Sackett, Straus, Rosenberg and Haynes (2000), Stahl (2004), Hendler (2004) and Mayer (2010). Starting with the definition by Stahl alluded to in section 1.2, EBM is regarded as a scientific procedure of medical practice that demands that healthcare providers should dutifully, clearly and thoughtfully or prudently seek out, interpret and use the current best evidence from clinical care research to determine the management of individual patients (Stahl, 2004:114). Sackett, et al (2000:3) also defines EBM as the conscious and judicious use of current best evidence from clinical care research in the management of individual patients while acknowledging that EBM's emphasis on evidence should not be treated like a cookbook for decision making. Hendler (2004) extends the conceptualisation of EBM to include personal values and even concerns of patients. In his definition he says that EBM is the practice of supporting clinical decision making with systematic research, while taking into account the personal values, unique biology, and individual concerns of each patient (Hendler, 2004:7). However, Mayer (2010:14) points out that EBM relies on the doctors' ability to identify the right medical evidence which comes in different types known as hierarchy of evidence, also known as an evidence table as shown in Table 3.1. The table shows that evidence ranges from formal open clinical randomised trials

to validation studies. Stahl (2004) also argues that medical evidence can be ranked from absolute proven interventions to the least reliable knowledge.

**Table 3.1 Levels of medical evidence**

LEVEL	TYPE OF EVIDENCE
1	Formal, open, clinical randomised-controlled trials
2	Case controlled trials (comparison made but not randomised)
3	Observation studies (including surveys and questionnaires)
4	Anecdotal evidence (including independent user comments and reviews)
5	Methodological verification and validation studies

Source: Guyatt (2014:31, 126).

Evidence tables come in many ways but Table 3.1 is specifically presented to appreciate that in EBM, doctors are called upon to go beyond mere seeking of information to identifying, critiquing and categorising the gathered information into different types of medical evidence (Mayer, 2010:14; Levy, 2014). EBM also encourages doctors to always appraise their skills and abilities to identify the different types of evidence as illustrated in table 3.1 (Bussi eres *et al.*, 2015; Swennen *et al.*, 2013).

EBM expects doctors (and all other health workers) to have good information seeking behaviour that takes them through five steps with regard to gathering and implementing the evidence in a clinical decision (Maggio, 2016; Mayer, 2010). The first step involves using the available information (such as referral notes or any primary information) to formulate answerable questions (i.e. information needs). The second step is to search for the evidence that can best answer these questions. The third step involves the evaluation of the sourced evidence for its importance and validity using the evidence levels. The fourth step is where doctors integrate the found evidence with their clinical expertise and apply it in clinical practice while considering the patient values. The fifth and last step is the continuous evaluation of clinical practice itself. Thus under the EBM paradigm, the doctor must be able to seek and search for credible evidence, locate the information sources, evaluate the sourced information and then appropriately use it in clinical practice. Hisham *et al.* (2016b) actually argue that the successful implementation of EBM depends on individual doctor’s experiences, biases and attitudes on top of professional organisation of information and its

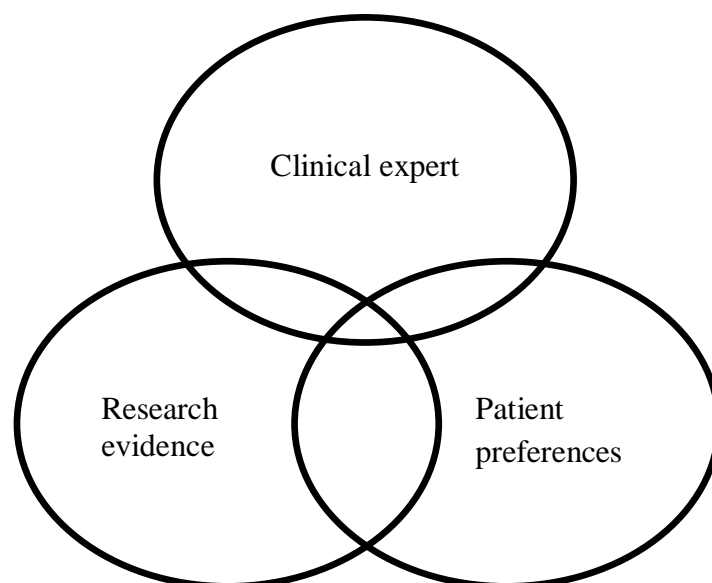
infrastructure at the institutions where the doctors work. Hisham *et al.* (2016b), for example, found in their study that the doctors with good information seeking practices and good attitude towards EBM go an extra mile to use novel ways such as cellular phones in order to overcome the barriers they face as they seek to implement EBM. The doctors must at the same time use their clinical expertise and patient values to come up with a clinical decision.

### 3.3 EBM MODELS

In light of the foregoing, EBM models generally seek to show the key links between EBM and information behaviour. Most models focus on three key aspects: clinical expertise (of the doctor), the clinical evidence or research evidence (commonly called the evidence) and the patient (his or her preferences and values). This section discusses the three key aspects of EBM in what is known as the Vanguard Circle model of EBM and in the updated version of the EBM model.

As illustrated in figure 3.1 the Vanguard circles (or Three Vanguard Circles) model is graphically represented by three circles, which symbolise the three sources of information for clinical decisions. The three circles are overlapped to illustrate that none of these sources of information should be the only source. According to Mayer (2010:10), Satterfield *et al.* (2009:379) and Sackett, et al (2000:3), the EBM model recognises that although these sources of information are idealised as having the same weight in influencing a clinical decision, clinical expertise is the most significant as it is put at the top in the other circles as shown in Figure 3.1.

Figure 3.1 The three Vanguard Circle Model of EBM (Satterfield *et al.*, 2009:371)



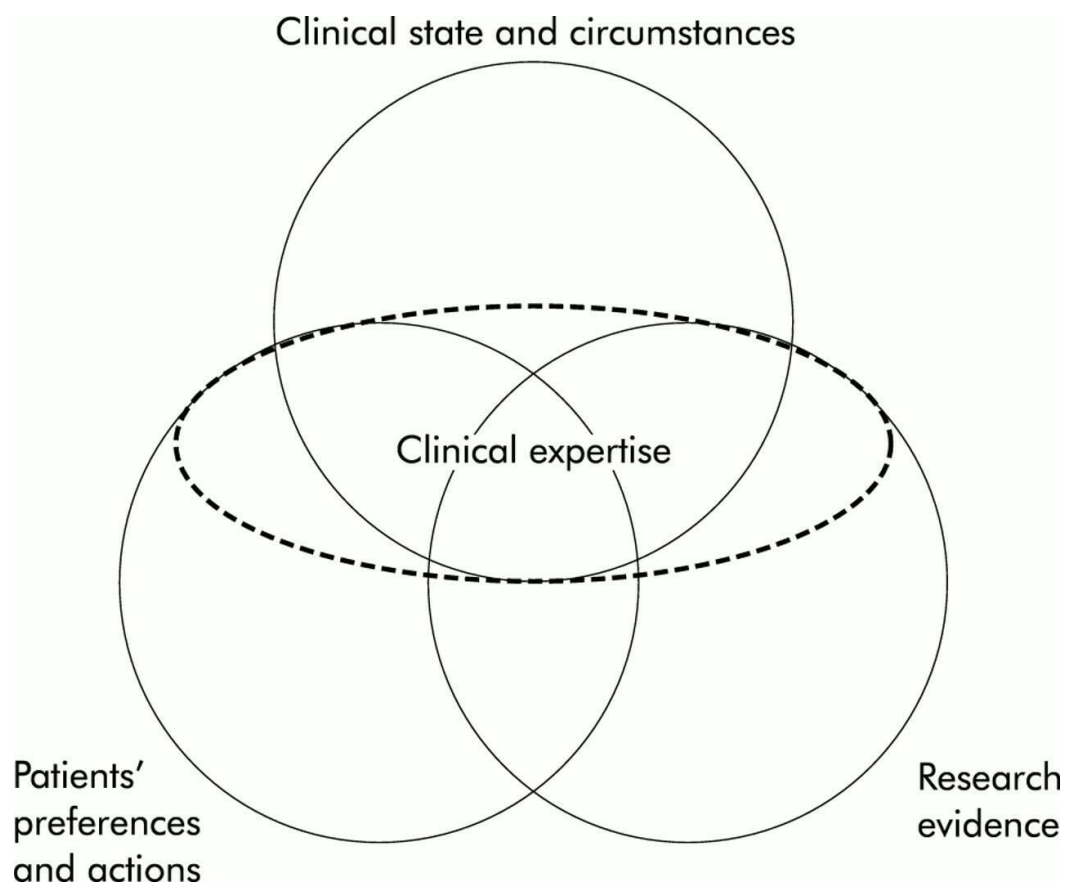
This model, demonstrates how medical research evidence could be incorporated into clinical practice alongside two other traditional sources of information which are; the clinical expert and the patient with specific reference to patient preferences (Mayer, 2010:10; Satterfield *et al.*, 2009:379; Sackett *et al.* 2000:4).

However, Satterfield *et al.* (2009:372) and Mayer (2010:10) indicate that a number of arguments have been raised against the Three Vanguard Circles Model. They show that firstly, the model is not clear in terms of how the three sources of information or data collected are to be integrated so as to equally foster a sound clinical decision (Mayer, 2010:10; Satterfield *et al.*, 2009:372). There is no formula, for instance, that can guide such integration despite the fact that the circles have the same weight, size and intersect each other uniformly. Secondly, they observe that the term ‘expert’ is vague and it is unclear in terms of its definition. Thirdly, although there are arguments that the patient is no longer ignorant in the face of easy access to medical information, the model does not recognise the heterogeneous nature of patients (Mayer 2010:10; Satterfield *et al.*, 2009:372). It is easier, for example, for doctors to source answers for the clinical questions they formulate from information literate patients who are able to access detailed medical information about their condition on their own than from illiterate patients (Satterfield *et al.*, 2009:372). The rationale therefore of treating the preferences of the information literate patients in the same way as the preferences of the information illiterate patients, who perhaps out of fear and ignorance could refuse the best treatment or medical procedure, is debatable (Hokkanen, 2007:275). Hokkanen (2007:275) specifically points to the contradiction between the scientific methods of administering treatment procedures and the traditional healing beliefs of illiterate cultures of Northern Malawi who for instance wanted western medicine to be administered where the pain is as is done in traditional medicine. There is therefore a need to balance the act between the medical expert and an illiterate patient. Bastan, Abolhasani and Shaarbafchizadeh (2014) actually highlight the need for new health electronic resources to be sensitive in terms of balancing the act between one extreme of an illiterate patient to the other extreme of an expert or specialty physician. Bastan, Abolhasani and Shaarbafchizadeh (2014) suggest that one of the ways to balance the act is to take time to educate both extremes (illiterate patient and specialty physician) in order to let them use content and language that would be well understood by both.

Satterfield *et al.* (2009: 372) and Mayer (2010:10) therefore propose the improvement of the original Three Vanguard Circles Model shown in Figure 3.1 to the EBM model shown in Figure 3.2. Satterfield *et al.* (2009:372) and Mayer (2010:10) specifically propose changes to

the following areas of the model: redefinition of the clinical expertise circle, relocating the clinical experience or expertise to the centre of the intersection of the three circles, maintaining the value of the clinical expert, and broadening the horizon of the model as shown in Figure 3.2 below. The graphical representation of EBM in Figure 3.2 is also called application of clinical evidence to a particular situation (Satterfield *et al.*, 2009:372; Mayer, 2010:171). The improvements in the EBM model redefine the clinical expertise circle and call it clinical state and circumstances (or clinical situation) while maintaining patient preferences and research (clinical) evidence besides accounting for the application of evidence for a particular situation (Mayer, 2010:10). The clinical expert in the revised model is the one, who besides having clinical skills, also has the ability to elicit the right clinical evidence, appropriately appraise it and consequently integrate those potentially dissimilar three sources of information i.e. the clinical expert, the clinical evidence and the patient preferences (Satterfield *et al.*, 2009:372; Mayer, 2010:10; Haynes, Devereaux & Guyatt, 2002:13).

**Figure 3.2 The Updated Three Circle Model of EBM**



(Satterfield *et al.*, 2009:372)

While these suggestions remain, most proponents and critics of EBM agree that no matter how the traditional three key sources of information within the clinical setting are weighted

or represented (graphically) in the EBM models and no matter the ethical issues that could be raised concerning any kind of weighting, doctors always look for clinical evidence (Satterfield *et al.*, 2009:372; Mayer, 2010:171). Satterfield *et al.* (2009) also report about other discipline models that evolved from the two EBM models discussed. Some of them are: evidence-based nursing (EBN), evidence-based psychology (EBP), evidence-based social work practice (EBSWP), evidence-based public health (EBPH) and the new trans-disciplinary model of evidence-based health practice (EBHP). This study acknowledges these models but does not discuss them because its focus is on the information behaviour of the doctor as he or she looks for evidence. Thus this study concentrates on the first two versions of the models that directly relate with the doctors.

### **3.4 EMPIRICAL STUDIES ON DOCTORS AND EBM**

There are many studies that have attempted to understand the relationship between doctors and EBM. These were conducted in both rich and middle economy countries (e.g., United Kingdom, China, Netherlands and Saudi Arabia) shown in Table 3.2 and in poor economy countries (e.g. Sudan, Sri Lanka, etc.) shown in Table 3.3. The separation of the two groups of studies is for clarity of the argument that despite EBM being a global phenomenon and an activating mechanism for the information behaviour of doctors, there are many intervening variables at play in different countries or different environments of doctors. The selected studies from rich and middle economy countries focus on: competence of doctors in EBM with or without training assistance (Kok *et al.*, 2013), analysing doctors' EBM practices by studying their use of EBM databases (Shen *et al.*, 2011); doctors' questioning behaviour and how it relates to lack of evidence (Davies, 2011); how doctors practice EBM (Lu & Li, 2013); attitude, knowledge and behaviour towards evidence-based medicine of physical therapists (Scholten-Peeters *et al.*, 2013) and perceptions, barriers, and practices of physicians towards EBM (Baig *et al.*, 2016). All these studies are of interest because of the way they project the various factors that stand in the way of the doctors' information seeking behaviour while they attempt to implement EBM.

This study acknowledges that studies of questioning behaviour of doctors have been taking place over a long period such as by Taylor (1968), Shenton (2008), Belsecker (2009) and Street and Millay (2009). These studies offer empirical evidence on questioning behaviour as a way of collecting information but do not contextualise that within the EBM paradigm. Thus this study only refers to them without analysing them to detail.

### 3.4.1 Studies from rich and fast growing middle economies

This section discusses only two of the studies from rich and fast growing middle economies summarised in Table 3.2. These are studies by Lu and Li (2013) from China and the study by Davies (2011) from the United Kingdom. Lu and Li's (2013) study is discussed because of the uniqueness of its methodology. Davies' (2011) study is discussed because it has been the reference point of many studies and how it relates to the self-rating objective of this study.

**Table 3.2 Empirical studies on doctors and EBM from rich and fast growing economies**

<b>Author(s) &amp; Date</b>	<b>Title of study</b>	<b>Methodology</b>	<b>Major findings</b>	<b>Research gaps</b>
Davies (2011)	Attitudes of UK doctors towards EBM and their self-perceived understanding of EBM terms.	A quantitative cross sectional survey of 415 doctors.	The younger doctors i.e., recent graduates, had a more positive attitude towards EBM than the old doctors.	There is need to establish whether this research outcome would apply to developing countries like Malawi with a different working environment for doctors.
Kok <i>et al.</i> (2013)	A clinically integrated postgraduate doctor training in EBM versus no training.	A quantitative study of 132 doctors divided into control and experimental groups.	The doctors who went through EBM training performed EBM better than those who did not go on training.	There is need to explore further how doctors trained in EBM can perform EBM in resource poor countries such as developing countries.
Shen <i>et al.</i> (2011)	Visualisation studies of EBM domain knowledge: mapping EBM research subjects.	Analysis of medical subject headings (MeSH) terms and keywords in EBM articles in the MEDLINE and China National Knowledge Infrastructure (CNKI) databases.	EBM is not largely practiced by doctors in China. One challenge is that the content of EBM resources is from Western countries.	This study does not fully acknowledge that the intervening variables impacting on doctors and EBM are not uniform. A study in the Malawian context, it is assumed, might thus yield different results.



Lu & Li (2013)	Extent to which doctors practised EBM in China.	Applied multivariate logistic analyses to predict the probability of physicians ceasing to prescribe rosiglitazone.	Specialists and experienced doctors practice EBM more than young doctors.	The study does not address variables related to the information behaviour of the young doctors or the extent to which findings might apply to poor countries.
Scholten-Peeters <i>et al.</i> (2013)	Attitude, knowledge and behaviour towards EBM of physical therapists.	Cross-sectional survey in which participants completed web-based questionnaire in Dutch.	There is poor attitude of physical therapists towards EBM due to lack of knowledge.	This study did not discuss the underlying causes of the poor attitude and low awareness.
Baig <i>et al.</i> (2016)	Perceptions, barriers, and practices of physicians towards EBM.	Cross-section survey where questionnaires were sent to 100 physicians in Saudi Arabia.	Doctors had good attitudes towards EBM but knowledge and practice were not up to the mark.	The study did not use a mixed approach to fully explore the difference between attitude and skills.

Lu and Li (2013:44) conducted a survey that sought to find out how doctors practice EBM in China. The springboard of the Lu and Li (2013:44) study was the interest to establish whether doctors in China were practising EBM which is perceived as a practice that has gained global recognition. Lu and Li (2013:46) discovered as they gathered literature for their study that many researchers on the subject had used questionnaires to discuss factors obstructing the practice of EBM. They also established during their systematic reviews that there were no studies that used large-scale data analysis that focused on who had practised EBM and when they practised it. Lu and Li (2013:46) thus sought to fill this methodological gap. They designed a study that applied nationally representative data to analyse EBM practice. They specifically followed up the provision of new evidence regarding the prescription by doctors of rosiglitazone (an ant diabetic drug) which was believed to increase the risk of myocardial infarction. Lu and Li (2013:47) used the National Health Insurance Database in Taiwan to analyse the variations in rosiglitazone prescription by the doctors. The study period was from the second quarter of 2007 to the fourth quarter of 2008. A total of 2 536 doctors who

prescribed rosiglitazone at least once were included in this study. Lu and Li (2013:47) further applied multivariate logistic analysis to predict the probability of doctors ceasing to prescribe rosiglitazone. The methodology used by Lu and Li demonstrates the amount of ground that poor economy countries like Malawi have to cover before they can match up with the EBM standards in rich economies. This is because Malawi as alluded to earlier does not have a national health database and over 95% of the hospitals do not subscribe to any health or medical EBM databases apart from HINARI which is sponsored by World Health Organisation.

The results of Lu and Li's (2013:48) study showed that there was a significant improvement in EBM practice among specialists and experienced doctors. Endocrinologists were four times more likely to change rosiglitazone prescription habits than other specialists and doctors with more than 10 years of specialist experience performed better in EBM practice. However the overall observation of the study was that EBM was still not well practised among doctors in China. Implementation of EBM differed greatly among the different categories of doctors. The study found that specialists were the ones that practised EBM better than the other categories and this result guides the current study to explore whether different categories of doctors would relate to EBM differently in Malawi. Lu and Li also found out that patients did not have enough influence to modify the doctor's prescription behaviour in the clinics despite the new evidence on rosiglitazone becoming available in 2008. This finding justifies the debate on the extent to which the patient can influence clinical decisions. The gap that Lu and Li's study shows is that it has not qualified the patients that were used in the study as being literate or illiterate. However, Lu and Li's study concluded that EBM was still not well practised although it had a lot of potential. Further education and encouragement to strengthen doctors' EBM practice remained urgently needed within the Chinese medical community. Although Lu and Li's (2013:45) methodology is interestingly unique and would be easy to replicate in resource rich countries, it is doubted whether such an approach would be feasible in resource poor countries like Malawi which is in the early stages of implementing EBM and does not have a locally generated national medical database.

Davies (2011:263) conducted her study in the United Kingdom using an online questionnaire that was emailed to doctors. Davies' study is selected for discussion because of the uniqueness of demographic roles that are presented in its results. The aim of the study was to comprehend United Kingdom (UK) doctors' attitudes towards EBM and their self-perceived understanding of specified EBM terms. Davies (2011:267) found that 72.3% of the

interviewed doctors agreed that EBM improves patient outcomes. Over 85% of the interviewed doctors were either able to explain (or had some understanding of) all the specified EBM terms. Unlike Lu and Li (2013) who found that the most experienced doctors performed EBM better, Davies (2011:270) found that respondents who had graduated from medical school most recently were more positive towards EBM and had a stronger self-perceived understanding of the EBM terms than older conservative doctors. Davies (2011:270) also established that the doctors' understanding of EBM terms was more than previous published research. This result is a justification for more research into the aspects of doctors and EBM as it suggests that understanding or practising of EBM is improving with time. Davies' (2011:271) findings are of great interest to this study because it justifies the need for more worldwide research into aspects of EBM and doctors such as the information seeking behaviour of doctors just to establish whether this trend is taking place in both developed and developing countries. Davies' (2011:271) observation that the younger generation which is said to be the Internet generation is more comfortable at exploiting the EBM databases interests this study because there are many young doctors in Malawi who graduated from the medical school in the last ten years (Medical Council of Malawi, 2015).

### 3.4.2 EBM and doctors in developing economies

This section selected previous studies on EBM and doctors that were done in poor economy countries i.e. Africa and other developing countries in Asia and these are summarised in Table 3.3 below. The studies from the developing countries focus on; knowledge, attitudes and practices in EBM (Hisham *et al.*, 2016a; Mahmic-Kaknjo *et al.*, 2014; Abeysena *et al.*, 2010; Zeidan & Behairy, 2010), physicians' utilisation of an Internet medical database (Shabi *et al.*, 2011) and health care workers (which include doctors) in Africa's access to EBM information (McNairy, Wurcel, Huang & Daily, 2012). The studies by Abeysena *et al.* (2010) and Zeidan and Behairy (2010) are discussed because of the close similarities to Malawi of the contexts in which they were conducted (i.e. social-economic environment of Sri Lanka and Sudan).

**Table 3.3 Empirical studies of doctors and EBM from developing countries**

<b>Author(s) &amp; year</b>	<b>Title of study</b>	<b>Methodology</b>	<b>Major findings</b>	<b>Research gap</b>
Hisham <i>et al.</i> (2016b)	Rural doctors' views on and experiences with evidence-based	A qualitative methodology where purposive sampling was used to select four focus group	The level of evidence-based practice is low in the rural setting due to poor	This study did not explore the doctors and EBM in urban areas nor did it

	medicine: The freedom qualitative study.	discussions with 15 medical officers and three individual in-depth interviews in Malaysia.	awareness, knowledge, attitude and resources.	describe the conditions of the hospitals the doctors worked in.
Mahmic-Kaknjo <i>et al.</i> (2014)	Awareness, knowledge, use, and attitudes towards evidence-based medicine in a developing country.	Cross-sectional study; self-administered questionnaire to 559 physicians.	Doctors have a positive attitude to EBM but despite this, there is low awareness and there is need for training in EBM.	The study was limited to one database i.e. The Cochrane Library without exploring other databases.
Abeysena <i>et al.</i> (2010)	Knowledge attitudes and practices of EBM in Sri Lanka.	Interviewed 315 doctors using a pre-tested self-administered questionnaire.	Although the attitude of the doctors towards EBM is good, knowledge of EBM is poor and doctors face many barriers when seeking for medical evidence.	There is a need to take a pragmatic approach in order to understand the difference between good attitude and poor knowledge.
Zeidan and Behairy (2010)	Awareness and attitudes of doctors towards EBM.	Descriptive cross sectional survey of 141 resident doctors in Sudan.	There were 91% of the interviewed doctors who welcomed EBM and yet only 10% practised it because of many barriers.	This study did not focus on the other categories of doctors e.g. interns, registrars and specialists.
Shabi <i>et al.</i> (2011)	Physicians' utilisation of an Internet medical database.	Descriptive cross sectional survey of 540 physicians.	There is considerable increase on use of online medical databases among physicians.	There is need to establish the extent to which the use of the medical databases relates to EBM practice.
McNairy <i>et</i>	Health care	Selected one	The use of Internet	This study did

<i>al.</i> (2012)	workers in Africa access a broad range of topics using evidence-based online medical information.	Internet based medical (EBM) resource (UpToDate) and followed up on how it was being used in 4 hospitals in Africa.	based medical resources from the West is feasible in resource limited settings like Africa.	not explore how access to expensive resources like UpToDate can be sustained in Africa.
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The studies by Abeysena *et al.* (2010) and Zeidan and Behairy (2010) are also selected for discussion because of their reference to barriers that stood in the way of doctors as they practised EBM. The barriers are similar to the challenges that doctors in Malawi face as highlighted in Chapter 2. Abeysena *et al.* (2010:83) conducted a survey whose objective was to assess knowledge, attitudes and practices on EBM among doctors in selected hospitals in Sri Lanka. Sri Lanka is a developing country where the impact of its socio-economic dynamics on its population and health services is similar to that of Malawi although the two countries are ranked differently on the human development index (United Nations Development Programme [UNDP], 2018). Abeysena *et al.* (2010:85) interviewed 315 doctors from five government hospitals in Sri Lanka between December 2007 and January 2008. They used a pre-tested self-administered questionnaire for gathering information on knowledge, attitudes, and practices. Abeysena *et al.* (2010:85) found out that 87% of the interviewed doctors had heard about the term EBM, and that 30% were aware of the Cochrane Library and only 8.5% of the respondents were its current users. Abeysena *et al.* (2010) also found that 24% of the interviewed doctors were exposed to some form of EBM training prior to their survey. Their study also found that all three traditional sources of information within the EBM paradigm (clinical expertise, best external evidence and patient values) were known by 18% of the interviewed doctors. Abeysena *et al.* (2010) again found that the attitude of 76% of the interviewed doctors towards EBM was positive and they believed that the practice of EBM would lead to improved patient care despite the fact that only 54% of the interviewed doctors were using it.

Abeysena *et al.* (2010:86) found that the main barriers to practicing EBM were insufficient information resources, overwork or poor doctor to patient ratio, lack of exposure to EBM, lack of time and lack of endorsement of the need to practice EBM. Abeysena *et al.* (2010:86) concluded that based on these results, knowledge and practices of EBM among doctors in Sri Lanka are very poor despite the good attitude towards EBM. The Abeysena *et al.* (2010)

study's conclusion agrees with the observation made earlier by Lu and Li's (2013) study that probably it is one thing to train doctors in EBM and yet another thing to really have them practice EBM. Abeysena *et al.* (2010) did not account for the reason why about 50% of the interviewed doctors did not practice EBM despite the fact that 87% had heard about it and that 76% of the participants had a positive attitude. The Abeysena *et al.* (2010) study brings to light the question whether it is possible for the doctors to have a good attitude towards EBM and yet be limited by the lack of resources and lack of training in the areas that they are working in.

Zeidan and Behairy's (2010) study stands out as one of the most profound early studies on doctors and EBM in Africa. The methodology that Zeidan and Behairy employed was the use of a cross-sectional descriptive study on a randomly selected sample of 141 hospital resident doctors from teaching hospitals. Zeidan and Behairy's (2010:3) main outcome measures were: awareness and attitude towards EBM, access to the Internet and perceived barriers to EBM practice among participants. The results of their study showed that 92.1% of the interviewed doctors welcomed introduction and promotion of EBM in daily management of patients while 32.7% of the interviewed doctors thought that the most appropriate way to move towards EBM was by seeking and applying EBM summaries. Zeidan and Behairy (2010) also found that 82% of the interviewed doctors had access to the Internet and those who had never heard nor attended a course on EBM were 85%. Most profoundly, Zeidan and Behairy's (2010) study found that there were only 10% of the interviewed doctors who used EBM in 50% to 100% of their clinical practice. This result confirms the assertion that it is one thing to be trained in EBM and yet another to use it efficiently for implementing EBM as there could be many hindering factors that could stand in the way of the trained doctors. Zeidan and Behairy (2010) found that the major barriers to practicing EBM were; lack of time due to patient overload (indicated by 85% of interviewed doctors), lack of libraries (indicated by 65% of the interviewed doctors) limited resources (indicated by 62% of the interviewed doctors) and lack of training (indicated by 60% of the interviewed doctors). On the study's recommendation that EBM training should be one of the requirements of full registration in Sudan Medical Council, 79% of the interviewed doctors agreed with this proposal. This study observes that such a recommendation is of interest to the study of EBM practice and how it relates to the information practices of doctors in Malawi. Currently, training in EBM is acknowledged as being important for Malawian doctors although it is not yet a pre-requisite for membership registration for the Medical Council of Malawi (Medical Council of Malawi, 2015).

Zeidan and Behairy (2010:4) concluded from their study that although there is more support among doctors for the promotion of EBM, there is a deficit in knowledge and there is also lack of skills training for exploitation of EBM. Zeidan and Behairy (2010:5) recommended that there is need to plan and implement an effective EBM educational programme for both undergraduate and postgraduate doctors. Although the context of this study is close to that of Malawi, the assumption by Zeidan and Behairy's (2010) study is that the healthcare facilities where the interviewed doctors came from had uniform EBM resources such as; those proposed by Mackay (2015) and Woodward-Kron *et al.* (2015) among others. Such an assumption, could not account for the lack of implementation of EBM that came from lack of resources.

### **3.5 CONCLUSION**

This chapter has elaborated on the conceptualisation of EBM, discussed the EBM models and used them to demonstrate that EBM is an activating mechanism for the information practices of doctors. The chapter has also shown that most of the studies that were done with doctors and EBM did not account for the many intervening variables that could be at play as doctors access the desired medical evidence. The chapter therefore proposes that there is need to go beyond mere analysis of doctors and EBM and the traditional information sources (i.e. the doctor, the evidence and the patient) and be acquainted significantly with the subject of information behaviour itself. It is therefore the appreciation of the information behaviour paradigms that can help one to understand the doctor and information behaviour. The different empirical studies on doctors and EBM in different socio-economic contexts prompt this study to propose that there is need to understand both the doctors and their contexts using a social-cognitive paradigm of information behaviour. Information behaviour paradigms and selected models of information behaviour are discussed in chapter 4.

## **CHAPTER 4. PARADIGMS AND MODELS OF INFORMATION BEHAVIOUR**

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### **4.1 INTRODUCTION**

The projection of the information behaviour of doctors as an important aspect of EBM in the chapter 3 brings about the need to discuss information behaviour paradigms and models. The rationale is that both the EBM model and the empirical studies that have been discussed have limited explanation for the intervening variables of the doctors' information behaviour. Therefore, an understanding of information behaviour paradigms and models is seen as an option for deepening understanding of the information seeking behaviour of doctors. This chapter looks at three main paradigms or views and two models of information behaviour considered appropriate for purposes of this study. Specifically, the chapter defines and analyses the cognitive, the social, and the socio-cognitive paradigms or views of information behaviour. This is why this chapter justifies the adoption of a particular information behaviour paradigm or view and a particular model that accounts for the socio-cultural and the cognitive views of the information seeker (i.e. the doctor).

### **4.2 PARADIGMS APPLIED IN INFORMATION BEHAVIOUR RESEARCH**

Information behaviour paradigms or views vary in nature and scope of philosophical emphasis from one historical period to another (Lajoie-Paquette, 2005:120). This accounts for the differences in research approaches from the older to contemporary schools of thought in information behaviour (Case & Given, 2016:44; Case, 2012:6; Lajoie-Paquette, 2005:120). The early days of information behaviour research often had a narrow focus that was limited in terms of how the needs, motivations, habits and behaviour of information seekers were perceived (Case & Given, 2016:44; Case, 2012:6; Spink, 2010:79, 96). What mattered to information behaviour researchers at the time was how formal information systems served the needs of the population being studied (Case & Given, 2016:44; Case, 2007:6; Spink, 2010:79, 96). However, the emphasis in contemporary information behaviour research and paradigms has shifted from structured information systems to studying the information seeker as the finder, creator and user of information and his or her ability to cope with professional activities and everyday life and issues such as health information seeking (Case & Given, 2016:44; Case, 2007:6; Dervin, 2005:25; Spink, 2010:5). There is also renewed interest in studying the full spectrum of the information behaviour process from defining information needs to information seeking, searching and information use (Case & Given, 2016:44, 2016; Case 2012:6; Spink, 2010:79, 96). This fostered the evolution of three views of information behaviour namely; the cognitive, the social and the socio-cognitive (Spink, 2010:79; Spink,



2010:96). The subsequent paragraphs present each of these paradigms or views of information behaviour and examples of some of the popular models associated with them.

#### **4.2.1 Cognitive view of information behaviour**

The cognitive paradigm focuses on knowledge related processes like learning, remembering, perception, making sense and decision-making (Pettigrew, Fidel & Bruce, 2001:47). All these processes are significant if one has to understand the information seeking processes and preferences of the individual doctor. It is context independent and it seeks to explain the differences in information behaviour based on the individual's characteristics and attributes while using theories from cognitive psychology (Pettigrew, Fidel & Bruce, 2001:46). Pettigrew, Fidel and Bruce (2001:46) indicate that the cognitive view became significant in the 1970s as more researchers saw the need to include in information seeking studies, a cognitive view. It is not the purpose of this study to delve into the connection between the cognitive paradigm of information behaviour and the theories of cognitive psychology although the link is acknowledged. Some examples of the models and theories developed following a cognitive paradigm include: the anomalous state of knowledge which is known as ASK by Belkin, Oddy and Brooks (1982) (associated with information needs), the Ellis 1989 model (Ellis,1989), Kuhlthau's 1991 information search process model (Kuhlthau,1993), the theory of information encountering by Erdelez (1997), the sense-making theory by Dervin (1996) and the five ways of connecting personality to information by Heinström (2003). This study observes that the cognitive paradigm is strong in its ability to aid analysis of individual doctor characteristics like learning, remembering and decision making, but it fails to account for contextual factors. The special nature of the Malawian context highlighted in chapter 2 of this study and the observable contextual differences in the implementation of EBM by doctors in chapter 3 demonstrate the limitations the cognitive paradigm could have if it were used to account for information behaviour of doctors in Malawi.

#### **4.2.2 Social view of information behaviour**

The social view of information behaviour emerged in the 1990s with a focus on the social context (Pettigrew, Fidel & Bruce, 2001:54). The meanings and values associated with social, cultural and sociolinguistic aspects of information behaviour are fundamental in this paradigm or view. This view argues that for one to understand the meaning of any piece of information, one has to understand the context of information behaviour (Pettigrew, Field & Bruce, 2001:54). The origin of this paradigm is connected to the theory of the information worlds which argues that information needs are also a function of the worlds in which people live (Spink & Heinström, 2011:162). The theory of information worlds itself hinges on a

wide range of social disciplines with links to many social theories but this study only focuses on the social context as the carrier of meaning. Talja *et al.* (1999:752) for instance, suggests that “unlike behaviourists frameworks which tend to objectify context by evoking and describing it as a distinct, factual entity that is separated from the object of study, social frameworks consider context interpretively and holistically as a carrier of meaning”. The first and earliest model of the social view or paradigm of information behaviour is considered to be Chatman’s theory of information behaviour that arose from several ethnographical studies in the late 1980s (Chatman, 1996:193; Chatman, 2001). People’s convictions are to a large extent likened to social patterns and the assumption is that people are moulded by positions within family, profession, professional life, linguistic grouping, membership and other demographic circumstances (Pettigrew, Fidel & Bruce, 2001:44). The consideration of information behaviour within the professional contexts by this paradigm is of interest to this study which is focusing on the information behaviour of doctors within their professional context, although Pettigrew, Fidel and Bruce did not single out doctors in their work. Pettigrew, Fidel and Bruce (2001:44) further argue that the ideas shared by members in a social group are a powerful factor and knowledge is shared as the group develops. This description of the social groups and knowledge sharing is also supported by Johnson (2005:325). This kind of knowledge sharing then enhances the group’s control base on social intercourse, norms, and communication to the extent that the social environment facilitates, shapes or prevents information seeking (Pettigrew, Fidel & Bruce, 2001:44; Johnson, 2005:325). The social paradigm interests this study given the fact that the social and cultural contexts in which many information behaviour studies and theories or paradigms were conducted and propounded are mostly Western. These Western contexts are different from the African in general and specifically the Malawian contexts. There are suggestions that depict the African cultural and information context as uniquely different from that of the West. For example, Mosse and Byrne (2005:228) claim that the information culture of Africa is different from that of the West because Africa engages in collective use of information as opposed to the individualistic use of information prevalent in the West. Emeagwali and Dei (2014:vii) actually argue that the local indigenous knowledge in Africa resides in the cultural memories which are managed collectively. This argument is supported by Mawere (2011:22) who claims that the knowledge or mythological beliefs in Africa are collective.

The second example of the social view of information behaviour which is also known as the constructionist approach to information seeking is evident in the work of Tuominen and Savolainen (1997:81). Tuominen and Savolainen (1997:81) developed a model for the study of information as a discursive action. They define information as a communicative construct

which is produced in a social context. The sourcing or gathering of information and its use depends on the interactive nature and objectives of the communication. Tuominen and Savolainen (2002:272) later discarded the notion that knowledge is constructed on the basis of an information transfer model. However, Tuominen and Savolainen (2002:272) argue that knowledge does not take place when an expert, such as a journalist, contemplates the world and manufactures information which mirrors his or her understanding or perception of the world and then transfers it to the submissive and inactive recipient. Tuominen and Savolainen (2002:273) claim that for such an expert as a journalist to activate the mental faculties of the recipient of the knowledge or information, there has to be an agreement between the two. If the two parties act autonomously and are independent of each other, then no transfer of information can take place. Tuominen and Savolainen (2002:273) further argue that there also ought to be assurance and guarantees that the receiver of the transmitted information or knowledge must construct it in a manner that is similar to that of the sender. The major challenge of such a conception of the production of knowledge is that it is difficult to comprehend how a socio-discursive process influences the production of knowledge. One also has challenges if one wants to investigate the different knowledge conceptions in society. The implication of this is that different societies have different knowledge concepts and such a scenario is a potential challenge for global health which assumes that the appropriate information behaviour of doctors worldwide is now the key for good health service delivery (Straus *et al.*, 2005:2).

The question whether the different information environments of the developing and developed countries are fostering effective health service delivery uniformly is yet to be established. Babu (2008:6) and Hisham *et al.* (2016b) think that developing countries, and more especially their rural areas, have a lot of challenges or barriers that have to be surmounted before their health information services can match up with their counterparts in the West. This assertion is of interest to this study despite the fact that this is not a comparative study between the information behaviour of doctors in the developed countries and the information behaviour of doctors in developing countries.

#### **4.2.3 The socio-cognitive view of information behaviour**

The socio-cognitive view of information behaviour rests on the realisation that the notion of information behaviour is too complex to be limited to the cognitive view alone or the social view alone (Hjørland, 2002:257). The socio-cognitive view employs both cognitive and social considerations in its understanding of information and the information seeker. Leckie (2005:158) connect the socio-cognitive view of information behaviour to Giddens' old theory

of structuration which believes in the duality of the social structure and personal agency or individual acts. Giddens (1984:233) argues that human adaptation and change are rooted in social systems. As a result of this, the personal agency operates within a broad network of socio-structural influences. Giddens argues that in these transactions, people are producers as well as products of social systems. What this means for Giddens is that there is more to social life than random individual acts and these individual acts are not determined by social forces alone (Giddens 1984:233). Giddens further asserts that human actions and social structure are in a dynamic relationship with each other and it is the repetition of the individual's actions that produces the social structure itself. In Giddens' view, the social structure includes such factors as traditions, institutions, moral codes and established ways of doing things. He also claims that all these factors within the social structure can change when people or individuals begin to ignore them or if they start reproducing them differently. This explains why the interaction between the cognitive and socio-cultural environment is the pivot of the socio-cognitive view. This also explains why all research traditions within this paradigm focus on the relationship between the cognitive and the socio-cultural environment. The socio-cognitive view was also historically influenced by psychological theories of learning developed by Lev Vygotsky (1896-1934) whose argument is that a learning and thinking person is influenced by the social context in order to come up with a world view (Kozulin, Gindis, Ageyev & Miller, 2003: 270). Vygotsky's theory grew to be so popular in Russia, Europe and the United States that it influenced the understanding of human cognition and learning as social and cultural rather than individual phenomena; this applied to many disciplines including the socio-cognitive views of information behaviour (Kuhlthau, 1993).

### **4.3 MODELS OF INFORMATION BEHAVIOUR RELEVANT TO DOCTORS**

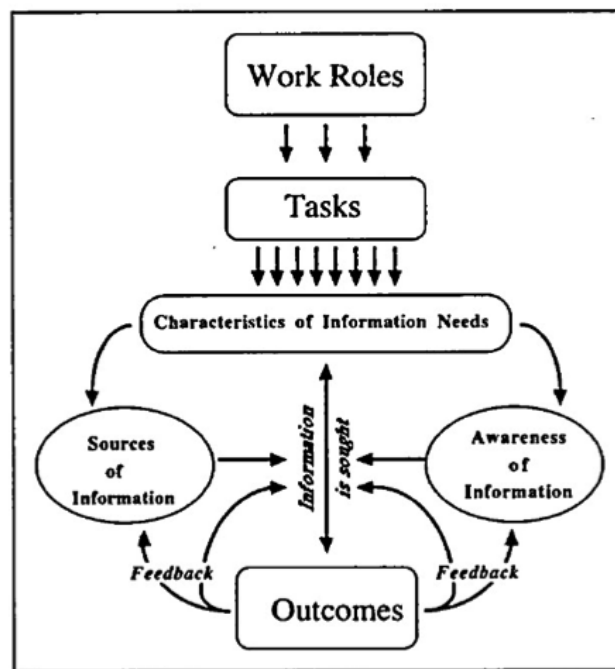
There are many information behaviour models within the health domain most of which only focus on the patient as the health information consumer and two such examples are: Kalor's 2010 'Planned Risk Information Model' (PRISM) and Afifi and Weiner's 2004 model (Case & Given, 2016:114). This study's focus however is on information behaviour models that were developed and tested on health professionals including doctors. Leckie, Pettigrew and Sylvain's 1996 model of information behaviour and Wilson's 1996 model of information behaviour stand out as two examples of such models (Case & Given, 2016:163).

#### **4.3.1 Leckie, Pettigrew and Sylvain's (1996) model of information behaviour**

Leckie, Pettigrew and Sylvain (1996) developed an information behaviour model, (shown in Figure 4.1 below) based on their study of public health professionals, engineers and lawyers and their information seeking behaviour. This model is briefly discussed because the study

that led to its development included health professionals as its subjects among others and by implication acknowledges the clinical roles and tasks of doctors as health workers and how these would relate to information seeking behaviour. The model is, however, not used to analyse the answers to the research questions of this study. As figure 4.1 illustrates the model has six components as follows: (1) work roles, (2) associated tasks, (3) characteristics of information needs, (4) awareness, (5) sources, and (6) outcomes and the last three aspects directly affect the information seeking process (Leckie, Pettigrew & Sylvain, 1996:161).

**Figure 4.1 Leckie, Pettigrew and Sylvain (1996) model of information seeking behaviour**



Source: <http://www.informationr.net/ir/10-1/p209fig1.gif>

The main argument of the model is that the roles and related tasks which professionals engage in on a daily basis are the main determinants of the information needs, which in turn trigger an information seeking process (Leckie, Pettigrew & Sylvain, 1996:180). Leckie, Pettigrew and Sylvain (1996:180) acknowledge that the information seeking process itself is greatly influenced by a number of interacting variables that affect the quality of the outcome. This model was applied to professionals in other contexts as follows: Bitso and Fourie (2012) used it to study the information behaviour of teachers in Lesotho; Baker (2004) used it to study the information behaviour of undercover female police officers; Du Preez (2007) used it to study the information behaviour of consulting engineers in South Africa; Kerins, Madden and Fulton (2004) used it to study the information behaviour of engineering and law students; Kostianen, Valtonen and Vakkari (2003) used it to study the information behaviour of the police in pre-trial investigations; and Landry (2006) used it to study the information

behaviour of dentists. This list of studies is given to demonstrate the popularity of the model without necessarily going into the details of each of the listed studies.

Leckie, Pettigrew and Sylvain's (1996) model has strengths and weaknesses: Case and Given (2016:170) and Case (2012, 2007:128) for instance, argue that in Leckie, Pettigrew and Sylvain's (1996) model, the causal process begins at the top with work roles which in turn influence information behaviour tasks. Leckie, Pettigrew and Sylvain's (1996) model is also criticised for separating work roles from tasks and for not seriously considering the impact of individual demographics such as age, profession, specialisation, career stage, geographic location, which are said to be key for influencing information behaviour (Case & Given, 2016; Case, 2012, 2007:128; Santrock, 2004:222). Case (2012, 2007:127) also observes that outcomes and characteristics of information needs influence each other much more than the Leckie, Pettigrew and Sylvain (1996) model itself depicts and because of this, there is need for the model to clearly define the terms that it uses. Case (2012, 2007:129) finally argues that Leckie, Pettigrew and Sylvain's (1996) model depicts information seeking behaviour itself as a two-way arrow labelled "information is sought" and the end result of information seeking is labelled "outcome" and this limits its application to everyday life.

#### **4.3.2 Wilson's 1996 model**

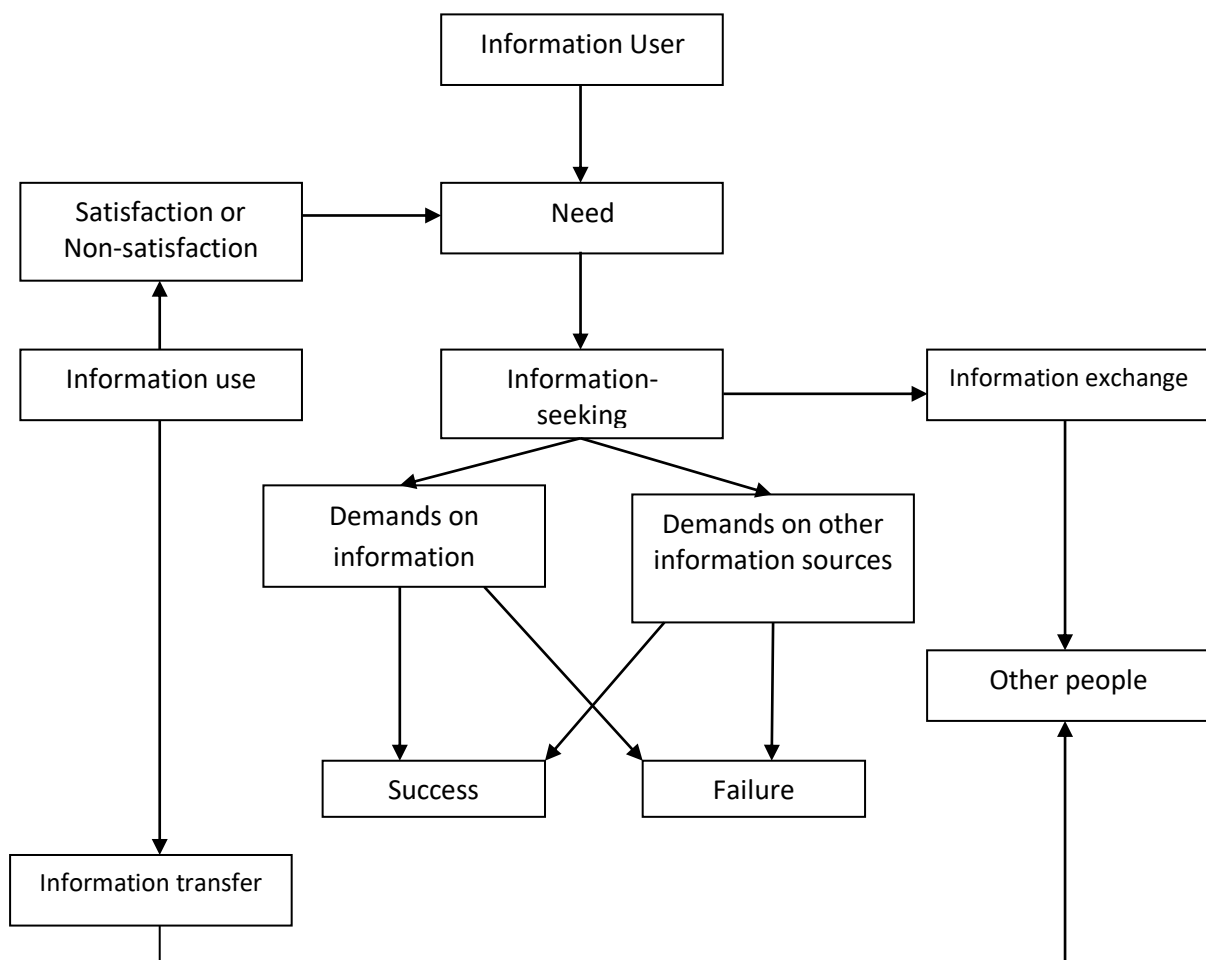
The Wilson 1996 information behaviour model (Figure 4.3 below) is significant to this study. It can only be appreciated against the backdrop of Wilson's 1981 model, whose diagram is shown in Figure 4.2 below. chapter 1 alluded to the fact that Wilson (2005) gives a good background to the progress from his 1981 model to his 1996 model and also to the revisions that were done in 1997 and 1999.

##### **4.3.2.1 Background to Wilson's 1996 model**

Wilson (2005) states that the 1981 model, which is not the centre of focus in this study, was conceived when he developed a paper for a doctoral seminar in 1971. Wilson (1999:4) presents the pivotal argument in the 1981 model as the consideration of the personal, social role and environmental context that brings about the need for information. The realisation of the need then gives rise to the information seeking behaviour which is divided into the physiological, affective and cognitive needs. Wilson (1999:4) theorises that as an information seeker responds to the physiological, affective and cognitive needs of information, he or she has to overcome the personal, interpersonal and environmental barriers before establishing observable information seeking behaviour. The role of the information seeker is influenced by work roles, the performance levels and the environment in which the information seeker finds himself or herself. The environment is subdivided into different types such as the

cultural environment, the political-economic environment and the physical environment. The singling out of the work roles of the information seeker and the subdivision of the environment by Wilson's model is of interest to this study given the specific circumstances of the doctors and Malawian context alluded to in chapter 2. Chapter 2 specifically presented Malawi as having fewer specialist doctors than general practitioners. It also noted that Malawian doctors are trained in different environments i.e. in both developed and developing countries. Wilson (1999:4) further states that the 1981 model, which is shown in Figure 4.2 below "is based on two main propositions; first, that the information need is not a primary need, but a secondary need that arises out of needs of a more basic kind: and second, that in the effort to discover information to satisfy a need, the enquirer is likely to meet with barriers of different kinds."

**Figure 4.2 Wilson's 1981 model of information behaviour (Wilson 1999:251)**



Wilson's (2007) own criticism of his 1981 model is that it does little more than provide a map of the area and draws attention to gaps in research apart from which it provides no suggestion of causative factors in information behaviour and presents no hypothesis to be tested. It is such criticism that brought about the evolution of Wilson's 1981 model. Case and

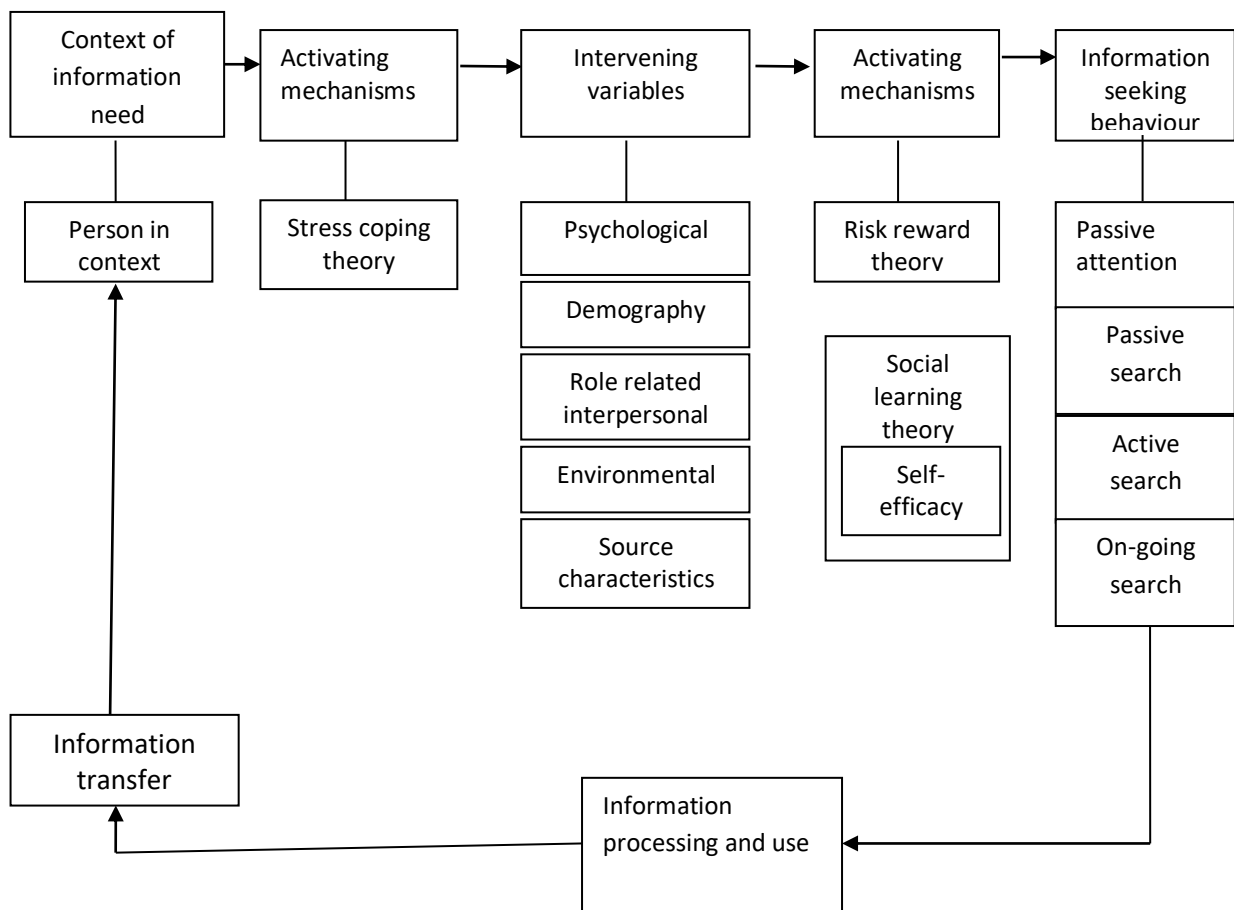
Given (2016:173), and Case (2012:137) observe that the evolution of Wilson’s first model to the second one makes it very interesting for research when compared to the other models because of the way in which it accounts for both the psychological and environmental barriers.

#### 4.3.2.2 Explanation of the Wilson 1996 model

The development of Wilson’s 1996 model which was revised in 1997 and 1999 was inspired by theories and findings from information systems development, consumer behaviour, health information systems, and the need for a clearer general model of information behaviour (Wilson, 2005). Wilson’s 1996 model, which is shown in Figure 4.3 below, was further inspired by the need to move beyond these general theories and embark on research in a range of disciplines after noting that the behaviour of information users had changed and was now attracting a lot of research interest (Wilson, 2005).

**Figure 4.3 Wilson's 1996 information behaviour model**

Source: <http://www.informationr.net/tdw/publ/papers/1999JDoc.html>





Wilson (1999:8) begins by looking at the context of information need. This provides the opportunity for researchers to assess separately the role-related context from non-role-related contexts of need. In the case of this study, Wilson's model gives the opportunity to this study to separate the context of clinical information needs of doctors from the context of their personal information needs that are not related to their clinical work. Wilson's model then moves from the context of need to understanding the activating mechanisms that foster the information seeking. These are the mechanisms that trigger or stimulate the information seeker to move from need to information seeking or searching. Chapter 3 of this study emphasised the need for doctors to comply with EBM practice which is assumed as one of their major activating mechanisms for the information seeking and searching process. However, the extent to which EBM as an operating policy in Malawian hospitals is activating or triggering information seeking can only be established by research. Wilson's 1996 model then lists broad categories of the intervening variables which can both be supportive or hindering to the information seeking process: The first type of intervening variable is the psychological inclination where the information seeker tends to be curious and risk averse. The second is the demographic background which considers such things as age and level of education. The third is the social variable which considers whether one is a manager or a mother. The fourth is the environmental variable which takes into account the resources available. The fifth intervening variable is the characteristics of the sources, for example; are the sources accessible and credible? The ability to account for the varied nature of intervening variables impacting on the information seeker in Wilson's 1996 model further provides a justification for using it as a framework for understanding this study's research questions on the information behaviour of doctors in Malawi. The problems and promises of the Malawi context given in chapter 2 have the potential for unique intervening variables and activating mechanisms for the information seeker. Wilson's 1996 model is ideal for this study because it distinguishes different types of search behaviour as being: passive attention, passive search, active search and on-going search (Wilson, 1999:8).

#### **4.3.2.3 Studies assessing the Wilson 1996 model**

There are many studies that have assessed the Wilson 1996 model of information behaviour but this section analyses only the study undertaken by Niedźwiedzka (2003). Niedźwiedzka (2003) stands out as the most significant researcher that tested Wilson's 1996 model within the health environment. Niedźwiedzka's study (2003) is being revisited here to further justify why Wilson's 1996 model is chosen as the main framework of this study. Niedźwiedzka (2003) conducted a study of the Polish healthcare system that was prompted by the large deficiencies of data and research evidence and lack of organised systems for information

provision. This is similar to the Malawian healthcare system where the health information management system is yet to be fully organised in a manner that adequately manages data and research evidence for clinical decisions (Galimoto, 2007; Scandvand, 2007; Malawi Ministry of Health, 2003). The aim of Niedźwiedzka's study was to determine the information needs, preferences and limitations of healthcare managers in their capacity as information users besides assessing environmental factors that challenged the satisfaction of these needs. The combination of doctors with other professionals within the health manager bracket in Niedźwiedzka's (2003) is seen by this study as a methodological weakness. This is because doctors have their own unique information needs which are induced by their quest for evidence to support urgent clinical decisions that could save a life. This is why this study selects doctors as one category of the hospital members of staff that have the responsibility to make the final clinical decisions. Niedźwiedzka's (2003) study population comprised hospital chief executives, medical directors, head nurses and directors of institutional support services such as planning and purchasing.

On the basis of the findings of her study Niedźwiedzka (2003) proposed that the Wilson 1996 model of information behaviour ought to be improved in a number of areas. Firstly she observes that the graphical representation of Wilson's 1996 model disconnects the incidence of the information need from the stage when the decision to seek information is performed and that this is not reflected in the model's diagrammatic representation (Figure 4.3). Secondly, she argues that Wilson's separation of context from the intervening variables that cause a person to look for information should be revisited because these intervening variables can be external from the person, internalised in the person and further still they can be both internal and external to the same person. Thirdly, she further argues that Wilson should have put the psychological variables and the demographic variables into one category called the personal variables with such subcategories as; physiological, affective, cognitive, and demographic. Fourthly, Niedźwiedzka (2003) disagrees with the treatment of information sources as a detached set of variables. She notes that the sources are part of the information environment and as such should be included in the environment variables. Fifthly, she observes that the graphical appearance of the model is misleading because it projects the intervening variables as influencing the user only at the stage of information seeking despite the fact that it can also do this at the stage of occurrence, decision making, processing and use. As a sixth observation, she says that the activating mechanism can be projected at any other stage and not just at one stage as graphically represented. Her seventh observation is a proposal that it would be important to specify the actual activating mechanisms such as stress, perception of risk, hope for reward, and perceived level of self-efficacy rather than just

speculate on each of these. Self-efficacy in this study is defined as an individual's belief in his or her capacity to organise and execute the courses of action required for specific performance attainments (Williams & Rhodes, 2016). Lastly, Niedźwiedzka (2003) argues that the arrows in the Wilson 1996 model are misleading because they imply that there is a causal relationship between the activating mechanisms and the intervening variables which could be a misrepresentation because both these mechanisms ought to be treated as psychological or sociological phenomena and not as independent elements of the context. Niedźwiedzka (2003) also observes that Wilson's 1996 model assumes that the user seeks the information personally and this neglects the other possible avenues for obtaining information such as intermediaries. She argues that work overload, lack of time, diversity of tasks and fragmentation spare the health managers (who include doctors) no time for personal searches, systematically and on a constant basis. Such observations are also found in other studies such as Mayer (2010), Babu (2008), Davies (2007), Dwairy, (2012), Norman and Hall (2014) and Hisham *et al.* (2016a).

Wilson (2005) acknowledges that the Wilson 1996 model is bound to change or evolve as more and more researchers apply it or employ it in their bid for solutions to understanding human information behaviour. It is such observations by Wilson (2005) that further motivated this study to employ Wilson's 1996 model for understanding the information behaviour of doctors in Malawi. This is because this study observes that both Niedźwiedzka (2003) and Wilson (2005) agree on the need to acknowledge the dynamism of the Wilson 1996 model itself.

#### **4.3.2.4 Implications of the Wilson 1996 model for this study**

The methodology of this study drew insight from the Wilson 1996 model of information behaviour as demonstrated in chapter 5. This section gives only a brief overview. Firstly, the provision for the context in which information is needed and sought in the model is used by this study to justify the study's limitation of context to the clinical context on the one hand. On the other hand, there is an opportunity for this study to assess whether there is a link at all between the private information behaviour of the doctor and the clinical context itself. Secondly, this study is suggesting EBM as the major activating mechanism of the information seeking behaviour of doctors within the clinical context but there is need to explore other activating mechanisms as well through empirical research. Thirdly, the Wilson 1996 model is criticised on the basis of broad categorisation of intervening variables as psychological, demographic, social, environmental and characteristics of sources. Fourthly, this study seeks to further analyse the Wilson 1996 model's presentation and recommended presentations by

critics such as Niedźwiedzka (2003). This study's findings for instance could be used to understand which presentation of intervening variables complies best with the context of a developing country such as Malawi. Could EBM indeed be the activating mechanism of the information seeking behaviour of the doctors within the clinical context in Malawi? This study seeks to explore the nature of information needs, information seeking and searching preferences of the doctors. Finally this study seeks to explore the extent to which the information sharing among doctors satisfies their information needs. The ultimate aim is to answer the question whether Wilson's 1996 model can be applied to the information behaviour of doctors in Malawi with regard to EBM or whether there would be need for a special model.

#### **4.4 EMPIRICAL STUDIES ON INFORMATION BEHAVIOUR OF DOCTORS**

This section looks at empirical studies that were reported on information behaviour of doctors without necessarily binding themselves to a particular theory or framework of information behaviour and EBM. This is presented to further appreciate the nature of activating mechanisms and intervening variables among the doctors as they seek information. Are they, for example, different from the ones discussed in chapter 3 of EBM or the ones observed by Niedźwiedzka (2003) while she analysed Wilson's 1996 model?

Research on doctors' information seeking behaviour reveals a relationship between information needs, information seeking, information searching and the use of information and their critical clinical roles (Case & Given, 2016:297; Case, 2012, 2007; Mai, 2012; Davies, 2007). The extent of searching skills of the doctors influences the level of exploitation of the information resources and also their ability to use such sources to satisfy their clinical information needs (Case & Given, 2016:2; Mai, 2012; Case, 2012; Davies, 2007). What seems to emerge from the empirical literature on doctors' information seeking behaviour is focus on problem definition and analysis of seeking or searching skills, information sources, information needs and information use. For example, the studies reviewed in the subsequent paragraphs range from use and perception of information among family physicians (Kosteniuk & Morgan, 2013), information-seeking skills of junior doctors (Cullen, Clark & Esson, 2011), information behaviour of clinicians and their attitudes towards clinical informaticists (Flynn & McGuinness, 2011), information needs and information seeking behaviour of family physicians (González-González, 2007), use of information by doctors in real time (Tiburt *et al.*, 2007). Each of these studies is presented in the subsequent paragraphs in chronological order beginning with the most recent reviews.

Kosteniuk and Morgan (2013) conducted a study on 'Use and perception of information among family physicians' considered accessible, relevant and reliable.' The first objective of their study sought to find out what were the most popular sources of information that family physicians used every time they wanted to update their general medical knowledge that could address specific clinical decisions (Kosteniuk & Morgan, 2013:2). The second objective of the study was to establish 'the information sources family physicians found to be most physically accessible, intellectually accessible (easy to understand), reliable (trustworthy), and relevant to their needs' (Kosteniuk & Morgan, 2013:2). A quantitative approach which involved a cross sectional postal survey on 792 family physicians in the Saskatchewan province in Canada was used. Kosteniuk and Morgan (2013:2) found out that the two top most popular sources of information among the family physicians were medical textbooks and colleagues in the main patient care setting. The medical textbooks were also considered the most intellectually accessible while colleagues were the most physically accessible. Kosteniuk and Morgan's (2013:2) distinction of physically accessible sources and intellectually accessible sources influences the methodological design and interpretation of the results of the information behaviour of doctors in Malawi. This is because intellectual accessibility of sources implies a more direct link to the opinion of the user and further connotes the subjective judgement of the user. No study so far was conducted on Malawian doctors that differentiated intellectual accessibility of information resources from physically accessible information resources. However, given the fact that Chapter 2 of this study has lamented about the poorly stocked libraries in Malawian hospitals and the poor ratios of specialist doctors to general practitioners and doctors to patients, the relationship between intellectual accessibility and physical accessibility of information items offers a considerable research gap.

Flynn and McGuiness (2011) conducted a study titled 'Hospital clinicians' information behaviour and attitudes towards the 'Clinical Informationist': an Irish survey.' The thrust of this study was the expectation that hospital clinicians should always look for evidence to back their clinical decisions in order to minimise medical errors and ensure quality patient care. This notwithstanding, the study observed that there were many obstacles to information seeking of hospital clinicians and these justified the introduction of a Clinical Informationist (CI) as a possible solution. The study, therefore, wanted to find out what the clinicians thought were their information needs and the information seeking abilities that they had besides establishing their attitude towards the proposed Clinical Informationist. Flynn and McGuiness (2011:25) developed a questionnaire survey approach which was distributed to the 22 clinicians in two Irish hospitals. At this point, it is interesting to note the variation of

the sample size from 22 clinicians in Flynn and McGuiness' (2011) study to 792 family physicians in Kosteniuk and Morgan's (2013) study. What is emerging from the methodological approaches taken by different researchers in information behaviour of doctors is that there is flexibility in terms of definition of the sample size. Flynn and McGuiness' (2011:26) major finding of their research, which bears on this study, was that clinicians encounter different kinds of information needs for patient care, and that many hurdles stand in their way such as time constraints and insufficient access to resources. This discovery echoes the doctors' predicament that was outlined in the problem definition of Chapter 1 and the challenges of the Malawian doctor outlined in Chapter 2 further justifies the study of the information behaviour of doctors in Malawi. Another vital discovery of Flynn and McGuiness (2011) study was realisation that clinicians had a positive attitude towards the clinical informaticist as a solution to their information seeking problems. The issue of the clinical informaticist as an intermediary in information behaviour contributes to the debate between Niedźwiedzka (2003) and Wilson (2005) on the role of the intermediary in Wilson's 1996 model of information of behaviour. It is also of research interest to the study of information behaviour of doctors in Malawi where clinical informaticists are not part of the health professional team.

Cullen *et al.* (2011) conducted a study on the information-seeking skills of junior doctors entering the workforce which specifically evaluated the impact of information literacy training during the pre-clinical years in New Zealand. The study objective was to 'investigate the extent to which junior doctors in their first clinical positions retained information literacy skills taught as part of their undergraduate education' (Cullen *et al.*, 2011:122). This objective relates to the concern raised in the study of medical students in Malawi by Mawindo (2006) in chapter 1 of this study as to whether the information seeking skills of medical students would correlate to their information seeking skills in the practising years. Cullen *et al.* (2011:123) used a method that made their research participants to recall any training that they had received besides evaluating their confidence in accessing and appraising information for their clinical decision making. The participants were also made to conduct a search on a situation in their area of specialisation and this was compared to a search by an experienced observer on the same scenario. The study found that 'most of the instructions the junior doctors had received, and their confidence in retrieving and evaluating information for clinical decision making was not at all linked to the type of training given during the pre-clinical years' (Cullen *et al.*, 2011:123). However, Cullen *et al.* (2011:123) found that the junior doctors who went through information literacy training in their postgraduate level were better in their ability to retrieve and appraise information than those

who had received through any training since their undergraduate qualification. The study, therefore, concluded that good information seeking and searching skills correlated directly to the continued information literacy that the junior doctors received after their undergraduate qualifications. The uniqueness of the Cullen *et al.* (2011) study besides the finding above is the comparison between the clinicians that had received the information literacy training after their pre-clinical years and those who had never gone through it. This comparison is of great research interest to the study on the information behaviour of Malawian doctors when Mawindo's (2006) concern in chapter 1 on the poor information literacy levels of medical students is considered.

González-González, (2007) studied the 'Information needs and information-seeking behaviour of primary care physicians' with a view to understand the information needs of primary care physicians in Spain and to define their information seeking patterns. In order to do this, they observed 112 primary care physicians who were practicing in Madrid. They video-recorded the physicians during their consultation for four hours from which they identified the type of clinical questions that were being asked besides analysing the information sources that were used. The physicians that did not manage to have their questions answered were followed up two weeks later by telephone just to make sure that the questions were answered and that the information sources that were used were determined (González-González, 2007:346). The results of González-González, (2007:347) showed very interesting relationships between the number of questions that a doctor asked a patient and how that related to diagnosis and treatment. More questions were asked for diagnosis (53%) than for treatment (26%). Other interesting aspects of this study were that the physicians looked for answers to only 22.8% of the questions that they asked during consultations and that on average they looked for answers from drug compendiums, textbooks and colleagues in just two minutes (González-González, 2007:346). Apparently, the study found the physicians took more time, 32 minutes, to find an answer for a question after consultation and that one of the major barriers was language as most of them being Spanish speakers were forced to use English (González-González, 2007:346). The projection of language as a barrier for the information seeking behaviour of physicians is a unique identification for this study. In the Malawi case there would have been two sides: The first is that language would not be a barrier because English is the official language in Malawi and the literate Malawians have no problems with it. The second is that the language barrier could apply to the failure by information seekers in Malawi to use appropriate terminology or formulations during information searches as pointed out by Mawindo (2006) and Chiweza (2005) in chapter 1. However, language could again be a barrier when foreign doctors are questioning illiterate

patients as close to 40% of Malawians are illiterate as reported by Hokkanen (2007). However, the normal practice in Malawi is that doctors are assisted by nurses who understand the local language of the patients who are illiterate patients or do not know English language. This study presupposes only research can establish the role of language in assisting doctors' definitions of information needs.

Tiburt *et al.* (2007) conducted a study on how doctors use information in real time at the John Hopkins University in Baltimore, USA. Their study sought to describe information exchange behaviour among internal medicine students. They used a qualitative approach for a sample population of 89 and discovered four themes of information exchange behaviour. The first theme was questioning behaviour which is used during communication with patients. The second theme was the searching behaviour for information resources. For instance, how do doctors search for physical and electronic information items? The third theme focused on how doctors react to unsolicited knowledge offering and the fourth theme focused on answering behaviours and how doctors responded to questions and queries that were put before them. Tiburt *et al.* (2007) concluded that clinic interactions between resident and attending doctors relied heavily on spoken deliberations without resorting to the scientific literature. They suggested that future research should deal more readily with the relationship between information resources and how they are used by the doctors for guidance during medical practice. Tiburt *et al.* (2007) also concluded that information needs of practicing doctors often go unmet and the influencing factors on information seeking behaviour are access, habit, reliability, quality, speed and ability to use information resources. The study also concluded that it was vital for doctors to acquire new pieces of information in their practice if they had to adequately address the question of evidence during their clinical decisions.

#### **4.5 STUDIES OF INFORMATION BEHAVIOUR OF DOCTORS IN AFRICA**

In Africa, the focus is mainly on single isolated studies on information behaviour without aligning it to EBM. This is best demonstrated in studies by Norbert and Lwoga (2013) who investigated the information seeking behaviour of physicians at the Muhimbili National Hospital (MNH) in Tanzania, or Ajegbomogun and Ajegbomogun (2013) and finally Nwfor-Orizu *et al.* (2015) who studied the extent of use of health information by doctors.

Norbert and Lwoga (2013) distributed copies of a survey questionnaire to 259 doctors at MNH in Tanzania. This study stands out because it focuses on the information behaviour practices of the doctors in an African context that is similar to Malawi and also used Wilson's 1996 model of information behaviour to systematically assess the doctors. Despite some



similarity with this study, Norbert and Lwoga's (2013) study did not project EBM as its motivation. Norbert and Lwoga personally distributed questionnaires to all physicians ( $n = 259$ ) at MNH. They found that physicians needed specific medical information to enhance their knowledge on a daily basis; particularly they needed information on patient care, rather than information for research and further education purposes. The study further found that in order to fulfil their information needs, physicians preferred to seek information from formal sources, which included printed textbooks, electronic resources and printed journals. The study found that the following challenges negatively affected the information behaviour practices of doctors: low use of the Internet for prescribing various drugs and diagnosis, poor ICT infrastructure, lack of access to a computer, frequent power cuts and lack of time.

Ajebomogun and Ajebomogun (2013) surveyed the Internet-based information seeking behaviour and utilisation by doctors in Federal Medical Centre (FMC), Abeokuta, Ogun State, Nigeria. They used a structured questionnaire which was administered to 150 doctors and in order to maximise their effectiveness in data collection, they involved the assistance of librarians. Ninety eight (98) copies of the questionnaires were completed, returned and used for this study, which represented a 65.3% response rate. The findings revealed that nearly all the doctors had access to the Internet, knew how to use it and it afforded them the opportunity of applying ideas gained from the use of Internet-based information to improve their work activities. The study found that the main challenge for the information behaviour of the doctors was the poor ICT infrastructure which hindered the utilisation of Internet information resources. The study recommended the revamping of the information infrastructure at the FMC as one way of motivating doctors to maximise their utilisation of Internet based medical resources.

Nwfor-Orizu *et al.* (2015) designed a study that sought to investigate the extent to which 1,995 doctors used and read electronic health information resources. The results found that personal Internet connection is the most frequently used; that medical libraries and hospital Internet connections are not used; that doctor's media of assessing health information are the Internet, electronic databases, textbooks, journals and colleagues, in that order of preference. Nwfor-Orizu *et al.* (2015) study recommended that the federal and state ministries of health and teaching hospital managements in South East Nigeria should equip and sustain clinics, offices and libraries with adequate Internet facilities.

What clearly emerges from the empirical studies on information seeking behaviour discussed in the preceding sections, are the need to consult a variety of sources, the presence of barriers that impact on information seeking behaviour, the need to improve information infrastructure

in hospitals, the importance of improving information literacy skills of doctors, as well as the importance of establishing a clinical information needs database related to patients.

#### **4.6 CONCLUSION**

This chapter expounded three information behaviour paradigms namely the cognitive, the social and socio-cognitive paradigms. The chapter also projected the socio-cognitive paradigm and Wilson's 1996 model as most relevant for understanding the information behaviour of Malawian doctors. The analysis of the information behaviour paradigms together with the information behaviour models that were highlighted, and also a review of selected empirical studies on information behaviour (as well as analysis of the evidence-based medicine in chapter 3) gave an opportunity for this study to consider the various approaches to the study of the information behaviour practices of doctors in Malawi. Chapter 4 therefore presents the methodology of this study.

## CHAPTER 5. METHODOLOGY

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### 5.1 INTRODUCTION

This chapter discusses the study's research design which has been influenced by the EBM paradigm, and Wilson 1996 models. The chapter discusses the research paradigm, research assumptions, methodological approach, research method, and data collection methods. The chapter also describes the study population, sampling frame and sampling methods, the selection of hospitals where the study was carried out and the way participants were identified. It further reports on data analysis tools, issues of reliability and validity, and compliance with the requirements of ethical clearance and adherence to ethical issues.

### 5.2 RESEARCH FRAMEWORKS AND ASSUMPTIONS GUIDING THE STUDY

The research frameworks and assumptions guiding this study were influenced by the EBM paradigm or view and an EBM model as well as the Wilson 1996 model discussed in chapters 3 and 4 and how these would motivate a study on the information behaviour of doctors.

EBM was suggested as an activating mechanism for information seeking behaviour which promotes the sourcing of clinical evidence for decision-making by the doctor at the point of care (Mayer, 2004:11). Chapter 3 specifically presented EBM as a possible solution for the delivery of good healthcare delivery services (Mayer, 2010). The information seeking behaviour of doctors must however be correspondent to the expectations of the five steps of EBM implementation (Mayer 2004:11). The five EBM steps include, framing questions, identifying literature, assessing the quality of information, summarising evidence gathered and interpreting the findings (Maggio, 2016; Mayer, 2010). Thus under the EBM paradigm, a doctor must be able to seek and search for credible evidence, locate the information sources, evaluate the sourced information and then appropriately use it in the clinical practice (Maggio, 2016). Doctors must at the same time use their clinical expertise and patient values to make clinical decisions. It becomes difficult to implement EBM if the information seeking behaviour of doctors is not compliant to these five steps (Babu, 2008:4; WHO, 2017:14).

Therefore based on the need for the implementation of EBM, the following assumptions were made with regard to the EBM of doctors in a developing country; these assumptions guided the decisions for the research design:

- For the successful implementation of EBM doctors must have the capacity and willingness to define their information needs. Information needs include the need to collect information from patients e.g. by asking questions on the clinical problem observed. Information needs also include the secondary needs that cause the doctor to

find further information from the subject literature and reported evidence that can guide clinical decision-making.

- For EBM to be efficiently implemented, doctors must have the skills and willingness to search the subject (medical) literature for best evidence and a further willingness to evaluate their search skills and to improve them.
- Doctors must be able to evaluate the evidence that is sourced according to their information needs and clinical cases they are treating.
- Evidence must be integrated with their clinical experience and must result in informed appropriate clinical decisions.

As is shown in Sections B (on EBM), C (on information behaviour and EBM) and D (on information behaviour) of the questionnaire in Appendix 1, questions were set to collect data on such assumptions. This created an opportunity to determine the extent to which doctors in Malawi are aware of and able to express their information needs, assess their information searching skills, seek and locate and evaluate sources and use the information they source to inform their clinical decision making process as a way of implementing EBM. The questionnaire questions also relate to the EBM model presented in Figure 3.1 and the five EBM steps. In finding answers to these questions, it was envisaged that the following sub-questions for the main research question (explained in section 1.4 of chapter 1) would be answered:

1. How do doctors in Malawi define their information needs?
2. What are the information seeking preferences of doctors in Malawi?
3. What are the self-rated information searching skills of doctors in Malawi?
4. What are the information sources that doctors in Malawi consult?
5. To what extent do doctors in Malawi use the information they source to inform their decision making process as a way of implementing EBM?
6. How can an understanding of their (doctors in Malawi) information seeking behaviour inform EBM practices?

The Wilson 1996 model and its potential value to serve as framework for a study on the information behaviour of doctors related to EBM was discussed and argued in chapter 4. The model confirms the importance to understand the: context of information needs, activating

mechanisms, intervening variables and information seeking behaviour related to information needs. It is argued that if the model is considered, the following applies: EBM is the activating mechanism and can also be the key intervening variable. The clinical setting is the primary context within which information is needed, sought, exchanged and applied as clinical evidence. This does not rule out the fact that apart from the clinical context i.e. the hospital context, there is also the general context i.e. the larger context beyond the hospital. Both the clinical and the general contexts offer both advantages and disadvantages that can impact on the information seeking behaviour of doctors. Thus the context can hinder or act as an activating mechanism of the information seeking behaviour of doctors. Chapter 2 of this study demonstrates that the salient problems in the Malawi context (i.e., the larger context) are that Malawians are more dependent on oral information than documented information (Anderson & Matthews, 2010:575), the doctors lack relevant information resources (WHO, 2017:14), there is a huge disease burden and poor doctor to patient ratio that denies the doctors enough time for information searches (Malawi Ministry of Health, 2010:3).

The development of this study's instruments, therefore, took into account the need to identify the key national and hospital specific contextual factors that hinder or serve as activating mechanisms of the information seeking behaviour of doctors in Malawi. Beyond context, Wilson's 1996 model also talks about other activating mechanisms that foster information seeking. These are activating mechanisms that trigger or stimulate the information seeker to move from need to information seeking or searching. In this regard, the model lists other broad categories of the intervening variables (as indicated in section 4.3.2.2 of chapter 4), which can both be supportive or hindering to the information seeking process. The first type of intervening variable is the psychological inclination where the information seeker tends to be curious and averse to risk. The second is the demographic background which considers such things as age and level of education. The third is the social variable which considers whether one is a manager or a mother. The fourth is an environmental variable which takes into account the resources available. The fifth intervening variable is the characteristics of the sources, for example; are the sources accessible and credible. The design of the study instruments purposively captured the various activating and intervening variables of information seeking behaviour as postulated by Wilson (1996).

### **5.3 RESEARCH APPROACH**

Without necessarily engaging in the philosophical debates about methodological paradigms, this study takes a pragmatic approach. This approach was deemed important because it enables the researcher to combine various methodological paradigms that best address the research problem (Connaway & Powell, 2010:236; Schwandt, 2007:196). It also considered both the objective and subjective aspects of the research process which allow the researcher to collect more meaningful data than is possible using one methodological paradigm (Creswell, 2014; Creswell & Plano Clark, 2010:53). Ultimately, a pragmatic paradigm allows for a mixed methods research approach that blends the positivist and the social constructivist in research methodology (Bergman, 2008:66). The positivist research approach utilises quantitative research methods which require the researcher to gather and interpret data into numerical forms using statistical calculations on the one hand. The social constructivist research approach on the other hand, is pivoted on qualitative research methods (Creswell, 2014; Creswell & Plano Clark, 2010:53; Schwandt, 2007:196). The qualitative research approach emphasises recording, analysing and trying to draw denotations of human behaviour and experience which include contradictory beliefs, behaviours and emotions (Merriam, 2009:2). The major interest of researchers using the qualitative method is to understand the smallest fibre of human experience without any generalisations (Silverman, 2006:43). Thus a combination of the positivist approach and the social constructivist approach were adopted for this study in order to gain both a bird's eye view picture and a realistic ground picture of the information behaviour practices of doctors in Malawi.

#### **5.3.1 Quantitative approach**

In this study the quantitative method was used to capture statistical trends associated with research question 2 on information seeking preferences of doctors in Malawi, research question 3 on doctor's information searching skills and research question 4 on the information sources the doctors consult (See section 5.2). This approach goes well with the behaviourist models of information behaviour which define information seeking behaviour in terms of skills and attributes of a person with appropriate information literacy skills that can be measured with scientific tools such as questionnaires (Bruce, 1997).

#### **5.3.2 Qualitative approach**

The qualitative approach was specifically employed in this study to allow the doctors to make responses, perceptions, and experiences with regard to information behaviour practices and EBM. Data was collected by means of an interview schedule (see Appendix 2). A qualitative approach was deemed important for research question 1 which focuses on doctors and

information needs definition; research question 5 which looks at how doctors share and use information and make decisions within the context of EBM; and research question 6 on how the understanding of information behaviour practices of doctors can inform EBM practices. The study used a phenomenological approach associated with qualitative research. Phenomenology is a strategy of enquiry that focuses on the life world or the experiential world every person takes for granted (Creswell, 2014; Creswell & Plano Clark, 2010). Phenomenology seeks to understand how persons construct meaning (Creswell, 2014; Creswell & Plano Clark, 2010:53; Bergman, 2008:66; Wilson, 2002). Examples of previous research into various aspects of the information seeking behaviour of doctors that used phenomenological approaches include studies by Lokman, Gabriel and Nicolson (2011) and Murphy and Maguire (2011). Lokman, Gabriel and Nicolson (2011), for example, collected stories from a population of 48 doctors during their study on hospital doctors' anxieties at work. Their phenomenological analysis focused on two stories that were most revealing.

### **5.3.3 Mixed methods approach**

In this study, a mixed methods approach was used. It is in line with the move away from approaches that were confined to the understanding of the information systems and the search tools to a focus on the user i.e. the human experience (Spink & Singh, 2012:179) and a social constructivist approach (Kotsirikou & Skiadas, 2010:14). Case and Given (2016), Case (2012) and Wilson (2005) also report that as much as quantitative research methodology is used in Information Science research, recent approaches to information behaviour research are accommodating qualitative research. As a result, the emerging trend in Information Science research accommodates the mixed methods research within the pragmatic paradigm (Kotsirikou & Skiadas, 2010:14). Mixed methods research has been used effectively in previous information behaviour studies such as Munyua and Stilwell (2010) who studied agriculture knowledge and information systems (AKIS) of small-scale farmers in Kiriyaanga in Kenya, Vilar and Zumer (2011) who looked at the information behaviour of young Slovenian researchers, Williams and Coles (2007) who studied 'Evidence-based practice in teaching: an information perspective' and Jamali and Asadi (2011) who examined 'The role of Google in scientists' information seeking behaviour.'

Mixed methods research combines the strengths of both quantitative and qualitative research methods. On the one hand, the use of qualitative methods, enables researchers to capture the social and institutional contexts of people's lives besides enabling them to access non-quantifiable information about people's understanding and perceptions, how they make sense of themselves and how they give meaning to daily lives (Creswell, 2014; Creswell & Plano

Clark, 2010:53; Bergman, 2008:66). On the other hand, use of quantitative approaches allows researchers to collect information on the prevalence of various activities, the people who participate, and popular conceptions of needs from a sample of selected groups (Creswell, 2014; Creswell & Plano Clark, 2010:53; Bergman, 2008:66). The next section therefore discusses the data collection for the qualitative and quantitative components of this study and how they specifically relate to this study's research questions.

#### **5.4 INSTRUMENTS FOR DATA COLLECTION**

The development of the quantitative and qualitative research instruments focused on the need to capture both qualitative and quantitative evidence.

##### **5.4.1 Instrument for quantitative data: questionnaire**

Quantitative data were collected from doctors with the use of a structured print based questionnaire. This questionnaire (see appendix 1) focused on seven sections which reflect the different parameters of information behaviour practices and the EBM steps associated with seeking of evidence by doctors. Section A of the questionnaire sought to briefly gather background information of each doctor and the key issues were the professional category under which the doctors fall, the qualifications and the number of patients that are seen by the doctor. These are important elements because the empirical literature reviewed in chapters 3 and 4 showed that the workload of doctors, level of education and place of training have a bearing on their information behaviour practices. Section B of the questionnaire contained questions aimed at gauging the doctors' perceptions of EBM. Section C related to the link between information behaviour practices and EBM and section D contained questions focusing on the doctors' information seeking and searching behaviour.

There were several challenges that were encountered during the visits to the hospitals where the doctors worked that induced this researcher to come up with different ways of administering the questionnaire. For example, some doctors requested that the questionnaire be left with them so that they could complete it in their own time; others asked this researcher to administer the questionnaire to them at their free times. There were also some doctors who preferred that the questionnaire be administered to them over the phone or Skype. In all the circumstances, an arrangement was made for them to sign the consent form.

##### **5.4.2 Instrument for qualitative data: individual interview**

An interview schedule was used as the qualitative instrument (Appendix 2) to collect data from key informants. It was designed to allow open ended interaction with doctors in such areas as: information needs, information seeking and searching, information sources,



information sharing and finally evidence-based medicine. Cresswell (2014) points out that a qualitative interview occurs when the researcher one or more participants open ended questions and records their answers. The advantages of qualitative interviews are that it allows participants to voice their experiences unconstrained by any perspectives of researchers or past research findings (Cresswell, 2012) Qualitative interviews also allow the participants to give the researcher responses with greater depth (Cresswell, 2012). The purpose of the interview schedule was to induce a discussion that allowed the interviewees to present their personal views and feelings of the theme or subtheme under discussion (Cresswell, 2014). This was very pertinent for elements of the study that required doctors' narratives of information needs, seeking, sources and channels of information and their perceptions of EBM. For example, under information need, the study required narrative stories of individual doctors' transition from a point of relying on their head and experiential knowledge to looking for extra evidence or information. Under information seeking, the study required responses on how the doctors looked for extra information for the challenges they face. The qualitative discussion also sought to gather responses about the most used sources of information and whether it was influenced by the doctors' choices or other intervening variables. The interview schedule also contained questions about information sharing channels and how they help the doctors to come up with better decisions, how the doctors understood EBM, and whether they really believed that it could influence information behaviour practices of doctors. The main disadvantage of qualitative interviews is that interviewees may be tempted to respond to questions with regard to pleasing the interviewees rather than answering the questions completely (Cresswell, 2012). It should be noted that during this study such kind of respondents were not observed.

The key informant interviews were also affected by the challenge of availability of doctors and as a result, three methods for conducting the interviews were devised. The first method was the person to person interviews of those who were available. The second method involved interviews through Skype calls. The third method was where direct phone calls were made to the doctors and discussions were held over the phone while taking notes or recording depending on whether the interviewee granted consent to record the interview. Arrangements were also made between the researcher and the doctors in methods two and three on how consent forms were to be signed.<sup>4</sup>

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<sup>4</sup> The consent form was emailed to the doctors and they went through it prior to the interview. Signed hard copy forms were collected later.

## **5.5 RESEARCH METHOD: SURVEY**

A survey was selected as the most appropriate method. This is because ‘a survey is used to primarily describe a population of interest, by showing the distribution of certain characteristics, attitudes, opinions, feelings or experiences within a population’ (Shi, 2007:190). Shi (2007:190) explains that a survey may also be used to find out the causal relationship among variables and be able to account for the observed relationship. A survey was adopted for this study to establish the information behaviour practices of doctors in Malawi in the following districts; Lilongwe district in the Central Region (300km from Blantyre), and in Blantyre and its neighbouring districts of Chiradzulu (25km from Blantyre), Thyolo (40km from Blantyre), Zomba (70km from Blantyre) in the Southern Region as shown in the map of Malawi in Figure 2.1 in chapter 2. The field work for the empirical study was conducted between September and October in 2015. The major challenge of the survey was that the doctors were not readily available because they were very busy. The doctors who were available had to be visited sometimes up to three or four times. This researcher actually recorded 3,620 kilometres of travel to and from the hospitals in the selected districts during the two-month data collection period.

## **5.6 STUDY POPULATION AND SAMPLING**

This section discusses the study population and factors that determined its size. It also describes the details of the sampling methods, the sampling formula and how study respondents (doctors) were identified.

### **5.6.1 Sampling method**

This study used geographical cluster sampling and purposive sampling in order to select the hospitals where the study was conducted, the survey population sample and the qualitative interviewing sample. Cluster sampling enables a researcher to select a number of clusters from the collection of clusters of the entire population that are relevant to the study (Creswell, 2014). In this study, geographical cluster sampling was used to select the study hospitals because the sampling frame, that is, the Medical Council of Malawi Register, keeps a record of practising doctors that includes their geographical location. The sampling frame showed that there were 600 doctors registered with the Medical Council of Malawi in 2015 but 67% (400) of these doctors were geographically clustered in Lilongwe district in the Central Region, and Blantyre and its neighbouring districts of Chiradzulu, Thyolo, Zomba in the Southern Region. The selected clusters also contain a mix of government referral hospitals and district hospitals commonly called district health centres, private hospitals run by the Christian Hospital Association of Malawi (CHAM). This allowed the researcher to ensure

that a variety of hospitals with different contexts and resource capacities were selected and rural/urban dimensions were also taken into account. Using this criteria, the study selected 3 urban government referral hospitals, 2 urban private hospitals, 2 rural government hospitals (i.e. district health centres) and 2 rural CHAM hospitals as shown in Table 5.1.

**Table 5.1 The summary of selected hospitals**

<b>Name of District</b>	<b>Urban government hospital</b>	<b>Rural government hospital</b>	<b>Urban private hospital</b>	<b>Rural CHAM hospital</b>	<b>TOTAL</b>
Blantyre	1		2	1	4
Chiradzulu		1		1	2
Thyolo		1			1
Zomba	1				1
Lilongwe	1				1
<b>TOTAL</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>9</b>

In the Lilongwe cluster in the Central Region of Malawi, Kamuzu Central Hospital was selected as the biggest referral hospital in the region housing over 50% of doctors from that region. In the Blantyre cluster in Southern Region of Malawi, Queen Elizabeth Central Hospital was selected as the biggest referral government hospital while Blantyre Adventist Hospital and Mwaiwathu Hospital represented the biggest private urban hospitals. Mlambe Mission Hospital was selected as a Blantyre rural hospital run by CHAM. Within the Blantyre surrounding districts, Chiradzulu and Thyolo district hospitals (i.e. district health centres) were selected as government district hospitals while St Joseph Mission hospital in Chiradzulu was selected as a rural CHAM hospital. Zomba Central Hospital was also chosen as an urban referral government hospital from the Southern Region. It should be noted that the challenge of availability of doctors, indicated earlier in sections 5.4.1 and 5.4.2 of this chapter is further demonstrated by the fact that although this researcher got permission to visit 9 hospitals, only 8 hospitals were available for data collection. The actual breakdown of respondents is as shown in Table 5.2 and Table 5.3. It should also be noted that only 173 of the 200 doctors who received the questionnaires returned them. There were 27 doctors who

indicated that they would fill the questionnaires at their own time, but who did not return the questionnaires in spite of several follow-ups.

### 5.6.2 Sample and participants

The Medical Council of Malawi register of 2015 shows that the population of doctors in Lilongwe, Zomba, Blantyre and its surrounding districts of Chiradzulu and Thyolo is 400. The sample population for the survey was calculated using Slovin's formula which states that  $n = N/1+Ne^2$  where  $e$  is an error margin of 5% (with a confidence level of 95%) and  $n =$  sample and  $N =$  total population (Rivera & Rivera, 2007:61). Slovin's formula was chosen because when there is a small population of around 400 or 500 as was the case in this study, it allows one to sample as much as almost half of the total population. Having a good portion of the population sample involved in the survey allows the study conclusions to be generalised with some degree of confidence. Therefore using Slovin's formula, the sample was calculated as:  $400/1+400 \times (0.05)^2$  which is  $400/1+1$  and is equal to 200. This study, therefore, targeted a sample population of 200 doctors and all these were administered with the questionnaires. It should however be noted that during the survey the actual number of doctors at the hospitals which were visited were not correspondent to those given by the Medical Council of Malawi register due to frequent transfers from one station to another. There were also many doctors who had gone for further studies within the year. This researcher therefore surveyed as many doctors as were available at any visited hospital. Table 5.2 below shows the actual breakdown of questionnaires that were administered and returned per hospital.

**Table 5.2 Number of questionnaires administered per hospital**

Name and type of hospital	Questionnaires
Kamuzu Central Government Referral Hospital	105
Queen Elizabeth Government Referral Hospital	55
Blantyre Adventist Private Hospital	2
Thyolo Rural Government District Hospital	2
Zomba Referral Government Hospital	5
Chiradzulu Government District Hospital	1
St Joseph Private (CHAM) Hospital	1

Mlambe Private (CHAM) Hospital	2
Total	173

Within the selected hospitals, purposive sampling was used to identify information rich cases for key informants that were used for the qualitative interviews (Gray, 2014:174). It should be noted that purposive sampling involved giving priority to senior doctors who were available while also minding that the other categories of doctors be represented. The plan was to interview 5 specialists, 5 resident doctors, 5 registrars and 5 interns i.e. 20 doctors. A sample size of 20 doctors was considered enough for the key informant interviews in a qualitative study in information behaviour practices research (Flynn & McGuinness, 2011). It should also be noted that during the survey or visits to the selected hospitals, the availability of doctors did not match with the planned distribution in each category due to mobility of doctors (i.e. attending meetings, transfers, away to professional training). This researcher therefore interviewed the doctors on the ground. Thus 20 doctors targeted for the qualitative key informant interviews were further purposively divided into different professional categories within the various hospitals as summarised in Table 5.3 below. (A list of the 20 key informants is given in Appendix 4.).

**Table 5.3 The qualitative population sample**

Name and type of hospital	Doctor category				
	Specialist	Registrars	Residents	Interns	Total
Kamuzu Central Government Referral Hospital	1		3	2	6
Queen Elizabeth Government Referral Hospital	6	1			7
Blantyre Adventist Private Hospital	1				1
Thyolo Rural Government District Hospital		1			1
Zomba Referral Government Hospital	1				1
Chiradzulu Government District Hospital		1			1
Chiradzulu CHAM Hospital		1			1
Mlambe CHAM Hospital		2			2
Total	9	6	3	2	20

### 5.7 RELIABILITY AND VALIDITY

This study approached reliability and validity without engaging in such philosophical debates on whether reliability and validity could be applied in the same way in qualitative and quantitative contexts (Gray, 2014:82). The research design and approach, however, acknowledged the argument that reliability and validity should be seen separately from the paradigmatic context of either the quantitative or the qualitative approach (Rubin & Babbie, 2010:209; Klenke, 2008:38). In quantitative research, on the one hand, reliability refers to the extent to which results are consistent over time, whether the population is represented accurately and whether the instrument can be replicated under a similar methodology (Rubin & Babbie, 2010:209; Klenke, 2008:38). Validity in quantitative research is seen as the determination of whether the research truly measures what it was intended to measure (Rubin & Babbie, 2010:209; Klenke, 2008:38). Patton (2002:14) argues, on the other hand, that in qualitative research, the need to justify the question of truthfulness in the research results brings about the need to explore issues of reliability and validity. The need for truth makes qualitative researchers to be concerned with analysing results and judging the quality during the design of any study. Patton (2002:14) goes on to argue that while validity and reliability

are essential criteria for quality in a quantitative paradigm, in a qualitative paradigm the terms reliability and validity are embedded in the paradigm's call for credibility, neutrality or conformability, consistence or dependability and applicability or transferability.

The quantitative and qualitative instruments of this study were considered reliable and valid because of four major reasons. Firstly, the quantitative instrument was tested before in information behaviour research on doctors in New Zealand by Dwairy (2012). It was adapted for the doctors in Malawian context and for the research questions of this study. The argument is that because it was reliable and valid in New Zealand, it could be replicated by this study for the Malawian context. Secondly, this study used a valid and reliable sample frame for the doctors, the 2015 Medical Council of Malawi (MCM) register. This register is a nationally recognised record of all the doctors and health professionals in Malawi and it is updated every year. All the categories of the doctors, (i.e., interns, registrars, residents and specialists and their distribution throughout Malawi), which are of interest to this study were accessible from this sample frame. Thirdly, the initial drafts of the instruments were submitted to two doctors and two qualified statisticians for validation. One of the doctors is a specialist in emergency medicine at Queen Elizabeth Central Hospital (QECH) in Blantyre City in the Southern Region of Malawi and the other a resident in obstetrics and gynaecology at Kamuzu Central Hospital (KCH) in Lilongwe City in the Central Region of Malawi. The statisticians were a senior lecturer at the University of Malawi College of Medicine and another senior lecturer at Chancellor College of the University of Malawi. The feedback provided by these reviewers enabled the refining of the tools in order to make them easily understood and comprehended by Malawian doctors. The feedback also enabled the survey instrument to be well synchronised with a data analysis statistical package called the Statistical Package for Social Sciences (SPSS) which was used for the analysis of quantitative data.

## **5.8 ETHICAL CONSIDERATIONS**

Before proceeding with data collection, the researcher sought approval from both the University of Malawi's College of Medicine Research and Ethics Committee (COMREC) which approves medical and health research of any type in Malawi and the Ethics Committee of the University of Pretoria through the Faculty of Engineering and Built Environment (EBIT). The researcher ensured that all the participants signed informed consent forms and that they had the right to withdraw. Permission for recording interviews was also obtained in writing as shown in Appendix 3 of this study. This is in keeping with the four general ethical guidelines which are commonly followed in investigations that involve humans. The first

ethical guideline is that participants should not be harmed in any way; the second requires, that at no time should participants be deceived; the third demands that any participation must be voluntary and the fourth demands that all the data must be treated and presented as confidential or anonymous (Case & Given, 2016; Case, 2012, 2007; Leedy & Ormrod, 2009; Mouton, 2001). Denscombe (2007) adds that researchers ought to act ethically not only in the collection of their data but also in the process of analysing the data and in the dissemination of findings. Denscombe (2007) argues that the ethical guidelines protect participants from researchers who might be tempted to use any means available to advance the state of knowledge on a given topic with bias. Denscombe (2007) further argues that the guidelines rest on the assumption that researchers have no privileged position in society that justifies them pursuing their interests at the expense of those they are studying. This is irrespective of how valuable the researchers hope the findings might be (Denscombe, 2007). This study did abide by all these ethical requirements for academic research and this is demonstrated through the informed consent form which is presented in Appendix 3. All participants signed the informed consent form and some of them gave written permission for interviews to be recorded.

## **5.9 DATA ANALYSIS**

All the information collected was systematically analysed in accordance with the research questions or specific objectives of the study, and in conformity with the mixed methods approach adopted. Quantitative data was analysed using Statistical Package for Social Sciences (SPSS), software for analysis of quantitative data (SPSS) while qualitative data was analysed using thematic analysis. This study's report is structured and organised according to the specific objectives outlined in chapter 1 and it captures both quantitative and qualitative information. Tables, graphs, and charts were utilised to illustrate the quantitative baseline findings.

## **5.10 CONCLUSION**

This chapter showed that the design of this study was based on an understanding of EBM as having a potential impact on the information behaviour practices of doctors and an investigation of information seeking behaviour. Key expectations of the factors influencing the information behaviour practices themselves, and the Malawian context was described with considerations from Wilson's 1996 model. The justification for the selection of a mixed methods approach is given. Reports on empirical studies that used the mixed method approach in information science and how they influenced this study were presented. Factors surrounding the design of the instruments, questions of reliability and validity and study



populations and sampling including tools for analysis of the research findings are also presented. Chapters 6 discusses the quantitative results.

## CHAPTER 6. QUANTITATIVE STUDY RESULTS

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### 6.1 INTRODUCTION

This chapter presents the empirical findings on the information behaviour practices of doctors in Malawi. The purpose of the empirical study was to find answers to the main research question: *How can the doctors in Malawi adequately cultivate information behaviour practices that is motivated by the EBM paradigm and that seeks to improve health service delivery and patient care in the midst of local challenges?* Specifically, the empirical study answered the following sub questions:

1. How do doctors in Malawi define their information needs?
2. What are the information seeking preferences of doctors in Malawi?
3. What are the information searching skills of doctors in Malawi and how do doctors rate their searching skills?
4. What are the information sources that doctors in Malawi consult?
5. To what extent do doctors in Malawi use the information they source to inform their decision making processes as a way of implementing EBM?
6. How can an understanding of their (doctors in Malawi) information behaviour practices inform EBM practices?

The findings are presented according to the research sub questions and specific questions contained in the questionnaire (Appendix 1) under each sub-question. The conceptual design of the study as depicted in chapters 1 and 5 was that research sub-questions 2, 3, and 4 would be answered using the study results from the quantitative instrument while sub-questions 1, 5, and 6 would be answered using the study results from the qualitative instrument. Table 6.1 shows the relationship between the relevant study sub-questions and the questions that were analysed under each of the objectives in the quantitative questionnaire. Chapter 7 presents the same details in relation to qualitative study findings.

**Table 6.1 Outline of the results in relation to the research questions and the quantitative results**

<b>Research questions</b>	<b>Quantitative results in response to the following questionnaire questions</b>
1. Profile of doctors	1,2,4,5,6,7,8
2. On definition of information needs	13,14,20
3. Information seeking preferences	16
4. Information searching skills	18
5. Sources doctors consult	17
6. Information use and EBM	9,10,11,12,13,14,15
7. Understanding of information behaviour practices and EBM practices	
8. Information sharing channels <sup>5</sup>	

## **6.2 QUANTITATIVE RESULTS**

Building on table 6.1, this section presents the quantitative findings. They are organised according to the four sections of the questionnaire which are: profile of the doctors or background information, evidence-based medicine, information behaviour practices and evidence-based medicine, and information seeking.

### **6.3 PROFILE OF THE DOCTORS**

The demographic profile of 173 (N) participating doctors that was analysed and documented from section 6.4.1 to 6.4.8 include qualification and place of training, place of medical training, main categories of the doctors, main place of duty, number of hospitals where doctors render clinical services, number of patients doctors see per week, number of days doctors see patients per week, the highest number of patients seen on a busiest day and type of hospital of primary employment.

#### **6.3.1 Qualification and place of training of doctors**

The literature shows that the qualification of doctors can influence their information seeking behaviour (Davies, 2011; Lu & Li, 2013). To determine the highest qualifications for the participating doctors question 1 (What is your highest qualification?) of the questionnaire asked the respondents to choose from the following options: Bachelor of Medicine and Bachelor of Surgery (MBBS) or Doctor of Medicine (MD), Master's degree, Doctoral degree, or they could indicate any other relevant degree that they held. All the 173 doctors (100%) returned the questionnaire. The results as depicted in Table 6.2 shows that 132 doctors (76.3% of N) had a Bachelor of Medicine and Bachelor of Surgery (MBBS) or a

<sup>5</sup> Although there was no separate research question or research objectives on information sharing, the interview schedule included questions under information sharing as another way of understanding their information behaviour.

Doctor of Medicine (MD) as their highest degree. This is followed by 32 doctors (18.5% of N) with a Master’s degree and 8 doctors (4.6% of N) with a doctoral degree. The Doctor of Dental Medicine degree was specified by 1 doctor (0.6% of N) as any another degree.

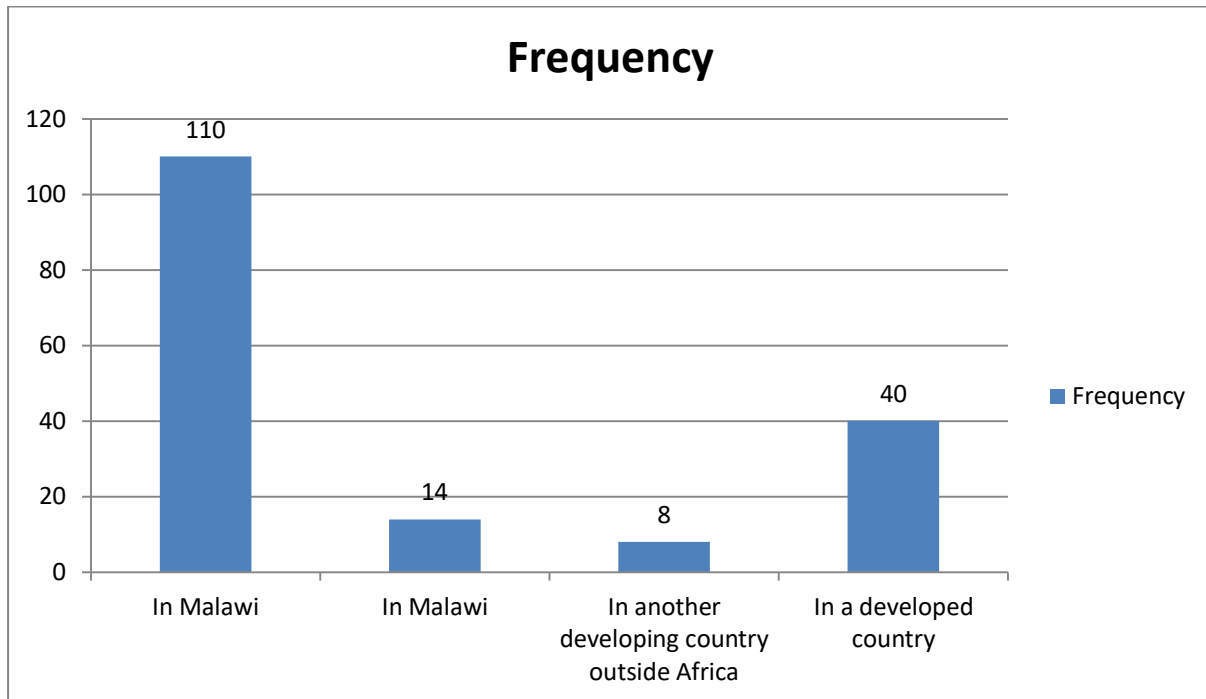
**Table 6.2 Doctors’ highest qualification**

<b>Type of qualification (N=173)</b>	<b>Frequency</b>	<b>Percentage</b>
MBBS or MD	132	76.3%
Master’s degree	32	18.5%
Doctorate degree	8	4.6%
Other (Doctor of Dental Medicine)	1	0.6%
Total	173	100%

### **6.3.2 Place of medical training**

The general assumption from the literature is that doctors trained in developed countries encounter better information resources during their training and are, therefore, likely to have better information seeking and searching skills than those trained in developing countries which lack such resources (Lwanda, 2007). In this study data on the place of training of the doctors was collected using question 2 (Where did you do your medical training) of the questionnaire (Appendix 1). This question specifically asked the doctors to select the place of training from the following options, in Malawi, in another developing country within Africa, in another developing country outside Africa and finally, in a developed country. Findings for this question are reported with N=172 doctors. The results which are graphically represented in Figure 6.1 show that 110 doctors (64% of N) reported that they had been trained in Malawi, 14 doctors (8.1% of N) indicated that they did their training in another developing country in Africa, 8 doctors (4.6% of N) indicated that they had been trained in another developing country outside Africa and finally 40 doctors (23.3% of N) indicated that they trained in a developed country. Figure 6.1 shows a graph depicting the number of doctors and their places of training.

**Figure 6.1 Number of doctors and their places of training**



### **6.3.3 Number of hospitals where doctors render clinical services**

The literature assumes that the way doctors distribute themselves between their main places of duty and outside the main place of duty affects their information seeking behaviour (Abeyseena *et al.*, 2010). Question 3 of the questionnaire (To how many hospitals are you rendering your clinical services?) required the study respondents to choose among five options for responses on at how many hospitals the doctors were rendering their clinical services. The options allowed the doctors to choose between one to four or more than four hospitals. The results for this question are reported with N=172 doctors. The results show that 138 doctors (80.2% of N) indicated that they worked at one hospital which was their main place of duty and employment, 22 doctors (12.8% of N) reported that they worked at two hospitals, 8 doctors (4.7% of N) indicated that they worked at three hospitals, 1 doctor (0.6% of N) indicated that he/she worked at four hospitals and 3 doctors (1.7% of N) reported that they worked at more than four hospitals.

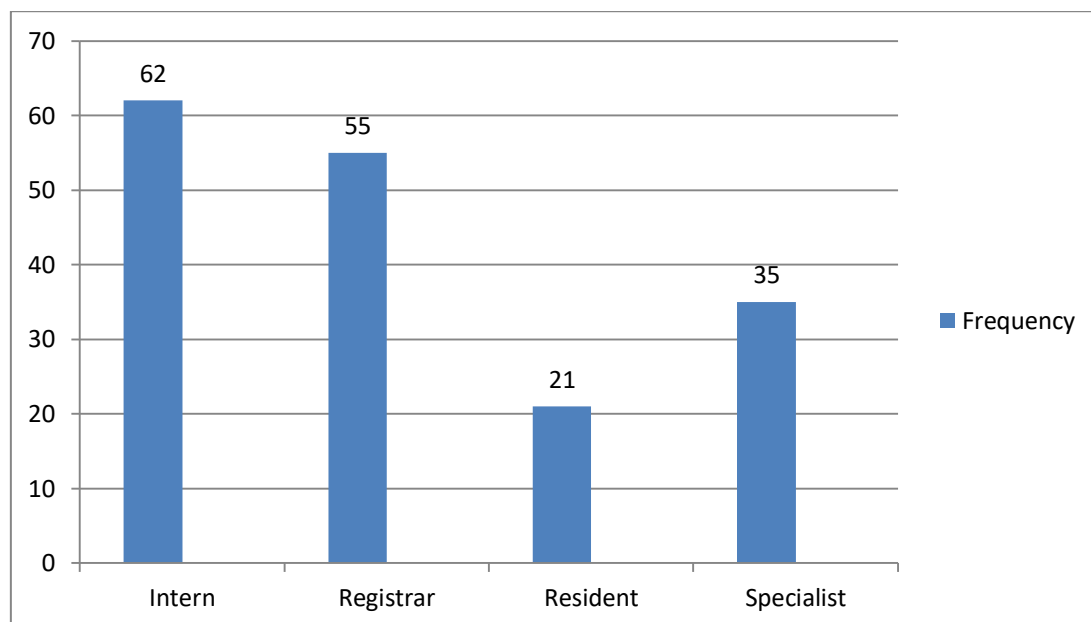
### **6.3.4 Professional categories and main place of duty**

There are two major arguments in the literature regarding the professional category of the doctors. The first is that the specialists and experienced doctors have better skills in information searching and use than the junior categories such as registrars and interns or generally younger and less experienced doctors (Lu & Li, 2013). The second is that the junior

categories such as registrars and interns (mostly younger doctors) are good at using electronic EBM resources (Davies, 2011).

The professional category options were listed as: intern, registrar, resident and specialist in question 4 (What is your current professional category at the hospital(s) where you work?) of the questionnaire which requested the doctors to indicate their current professional category. All the 173 doctors who returned their questionnaires answered question 4 and therefore findings are reported with N=173. The results show that 62 doctors (35.9% of N) identified themselves as interns, 55 doctors (31.8% of N) indicated they were registrars, 21 doctors (12.1% of N) reported that they were residents and 35 doctors (20.2% of N) identified themselves as specialists. Figure 6.2 below is a graph which shows how the professional categories were distributed among the doctors who were involved in the survey.

**Figure 6.2 The professional categories of the surveyed doctors**



### **6.3.5 Main place of duty and type of duties**

Data on the doctors' main place of duty was collected using the responses to question 5 (Where do you fulfil most of your duties [please tick the appropriate option for each of the following: main hospital refers to the hospital where you are primarily employed]) in the questionnaire (Appendix 1) which requested the doctors to indicate where they fulfilled most of their duties (clinical duties, administrative duties, research duties and teaching duties). The question further asked the doctors to compare their duties between their main places of duty (i.e. place of primary employment) with duties outside their main hospital. They had six options to choose from: clinical duties at the main hospital, administrative duties at the main hospital, clinical duties outside the main hospital, administrative duties outside the main

hospital, research, and teaching. It should be noted that the doctors were not requested to compare research and teaching duties between their main place of employment and outside. They were rather requested to indicate the amount of time they spent in general on research and teaching. The doctors were further asked to indicate what percentage of their time they gave to each of the duties. They could choose from the following options: 0%, less than 25%, 26-50%, 51-75% and 76-100%. The results, which are summarised in Table 6.3 below, are as follows:

a) Clinical duties at the main hospital

The results for question 5(a) are reported with N=170 as 3 doctors did not answer this question. The results further show that 138 doctors (81.2% of N) indicated that they spent 76-100% of their time on clinical duties at the main hospital, 17 doctors (10% of N) said they spent 51-75% of their time on clinical duties at the main hospital, 10 doctors (5.9% of N) indicated that they spent 26-50% of their time on clinical duties at the main hospital and 5 doctors (2.9% of N) said they engaged in clinical duties for less than 26% of the time at the main hospital. None of the doctors (0% of N) indicated that they spent none of their time on clinical duties at the main hospital.

b) Administrative duties at the main hospital

The findings for question 5(b) are reported with N=150 as 23 doctors did not answer this question. The results show that 94 doctors (62.7% of N) indicated that they never at all engaged in administrative duties at their main hospital. The doctors who engaged in administrative duties at their main hospital for less than 25% of their time were 34 doctors (22.7% of N). There were 13 doctors (8.7% of N) who indicated that they engaged in administrative duties at their main hospital 26-50% of their time, 2 doctors (1.3% of N) engaged in administrative duties at their main hospital 51-75% of their time and finally 7 doctors (4.6% of N) engaged in administrative duties at their main hospital 76-100% of their time.

c) Clinical duties outside main hospital

The findings for question 5(c) are reported with N=162 because 11 doctors did not answer this question. The results show that 109 doctors (67.3% of N) did not engage in any clinical duties (i.e. spent 0% of their time on clinical duties) outside their main hospital. There were 37 doctors (22.8% of N) who reported that they spent less than 25% of their time on clinical duties outside their main hospital. The results further show that 12 doctors (7.4% of N) spent 26-50% of their time on clinical duties outside their main hospital, and 1 doctor (0.6% of N) spent 51-75% of his/her time on clinical duties outside their main hospital, then 3 doctors (1.9% of N) spent 76-100% of their time on clinical duties outside their main hospital.

d) Administrative duties outside the main hospital

The findings for question 5(d) are reported with N=160 because 13 doctors did not answer this question. The results show that 137 doctors (85.6% of N) did not engage in any administrative duties outside their main hospital. There were 18 doctors (11.3% of N) who reported that they spent less than 25% of their time on administrative duties outside their main hospital. The results further show that 4 doctors (2.5% of N) spent 26-50% of their time on administrative duties outside their main hospital, and 1 doctor (0.6% of N) spent 76-100% on administrative duties outside their main hospital. None of the doctors (0% of N) indicated that they spent 51-75% of their time on administrative duties outside the main hospital.

e) Research duties

The results for question 5(e) are reported with N=162 as 11 doctors did not answer this question. The results show that 92 doctors (56.8% of N) did not engage in any research duties at their main hospital or outside their main hospital. The results also show that 52 doctors (32.1% of N) spent less than 25% of their time on research duties at their main hospital or outside. A further 10 doctors (6.2% of N) reported that they spent 26-50% of their time on research, and 3 doctors (1.9% of N) spent 51-75% on research while 5 doctors (3% of N) spent 76-100% of their time on research duties.

f) Teaching duties

The findings to question 5(f) are reported with N=164 as 9 doctors did not answer this question. The results show that 77 doctors (47% of N) did not engage in any teaching duties as they had indicated that they gave 0% of their time to teaching. The results also show that 50 doctors (30.5% of N) spent less than 25% of their time on teaching duties. The results further show that 25 doctors (15.2% of N) spent 26-50% of their time on teaching, and 6 doctors (3% of N) spent 51-75% on teaching and finally 7 doctors (4.3% of N) spent 76-100% of their time on teaching. Table 6.3 below shows the doctors' main duties within and outside the main hospital of duty.

**Table 6.3 Doctors and main duties within and outside main station**

List of the main duties	Percentage of time spent on each duty and number of doctors				
	0% of time	<25% of time	26-50% of time	51-75% of time	76-100% of time
Clinical duties at main hospital	0	5	10	17	138
Clinical duties outside main hospital	109	37	12	1	3



Administrative duties at main hospital	94	34	13	2	7
Administrative duties outside main hospital	137	18	4	0	1
Research	92	52	10	3	5
Teaching	77	50	25	5	7

From Table 6.3 it is evident that 138 doctors spent 76-100% of their time on clinical duties at their main place of employment. It is also evident that few doctors are involved in administrative tasks 76-100% of their time at their main hospital or outside their main hospital. The results also show that 5 doctors are involved in research and 7 doctors are involved in teaching duties.

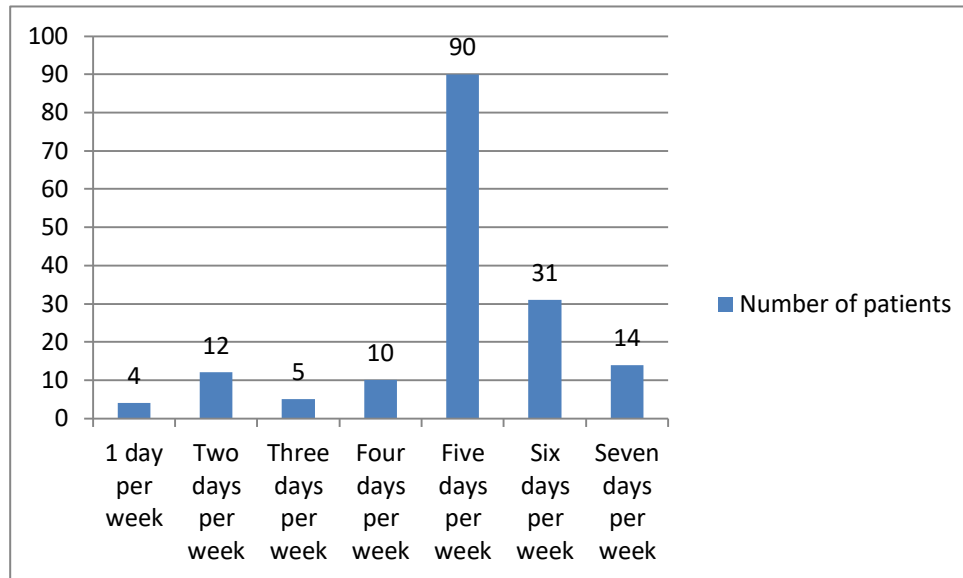
### 6.3.6 Number of days doctors see patients per week

The literature suggests that doctors in developing countries are overworked and as a result they do not have free time which they could use for seeking clinical information (Babu, 2008; Abeysena *et al.*, 2010; Zeidan & Behairy, 2010). In view of this, data for the number of days doctors see patients per week was captured through question 6 (How many days per week do you see patients?) in the questionnaire which asked the doctors about how many days per week they saw patients (a) for a full day and (b) for half a day. For both options participants could choose from 1 day per week to 7 days per week. The outcome of the responses on this question was as follows:

#### a) Number of days per week for seeing patients for a full day

The findings for question 6 (a) are reported with N=166 and 7 doctors did not answer this question. The results show that there were 90 doctors (54.2% of N) who indicated that they see patients for a full day for 5 days per week. A further 31 doctors (18.8% of N) indicated that they see patients for a full day for 6 days per week. The results also indicate that 14 doctors (8.4% of N) see patients for a full day for 7 days per week, 12 doctors (7.2% of N) see patients for a full day for 2 days per week, 10 doctors (6% of N) see patients for a full day for 4 days per week, 5 doctors (3% of N) see patients for a full day for 2 days per week and 4 doctors (2.4% of N) see patients for a full day 1 day per week. Figure 6.3 is a graph which confirms that most doctors see patients for a full day for 5 days a week. However, it is important to note that the combined results for doctors who responded to question 6 of the questionnaire show that 135 doctors out of the 173 doctors who returned the questionnaire who see patients for a full day for 5 to 7 days per week.

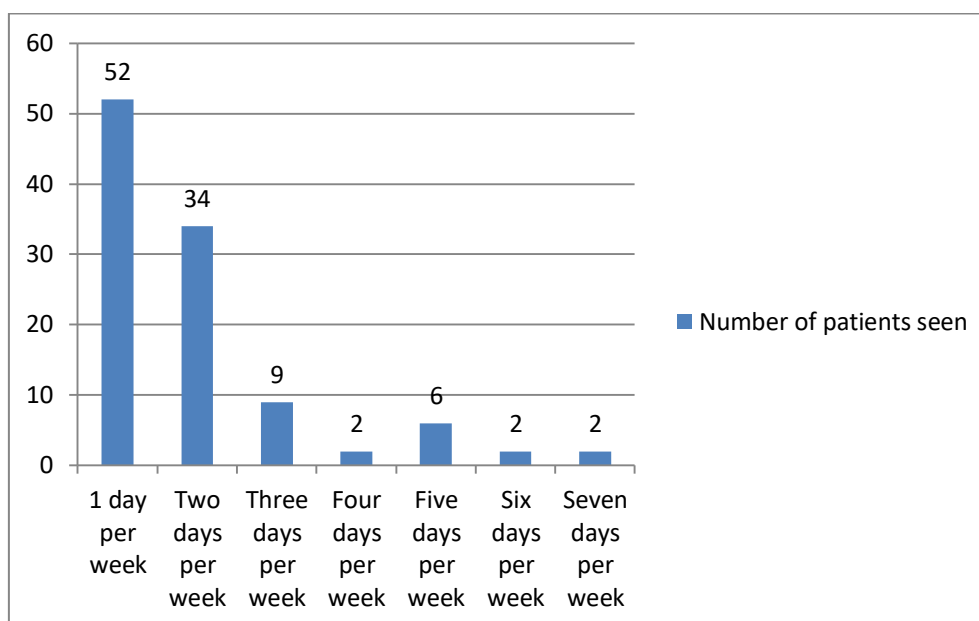
**Figure 6.3 Doctors and the number of days per week that they see patients for a full day**



b) Number of days per week for seeing patients for half a day

The findings for question 6(b) are reported with N=107 as 66 doctors did not answer this question. The results show that 52 doctors (48.6% of N) indicated that they see patients for half a day for 1 day per week, 34 doctors (31.7% of N) see patients for a half a day for 2 days a week, 9 doctors (8.4% of N) see patients for half a day for 3 days a week, 2 doctors (1.9% of N) see patients for half a day for 4 days a week, 6 doctors (5.6% of N) see patients for half a day for 5 days a week. A further 2 doctors (1.9% of N) see patients for half a day for 6 days a week and finally another 2 doctors (1.9% of N) see patients for half a day for 7 days a week. Figure 6.4 is a graph that demonstrates that doctors seeing patients for half a day mostly do this for 5 days a week, and in some cases 6 or 7 days.

**Figure 6.4 Number of days per week that doctors see patients for half a day**



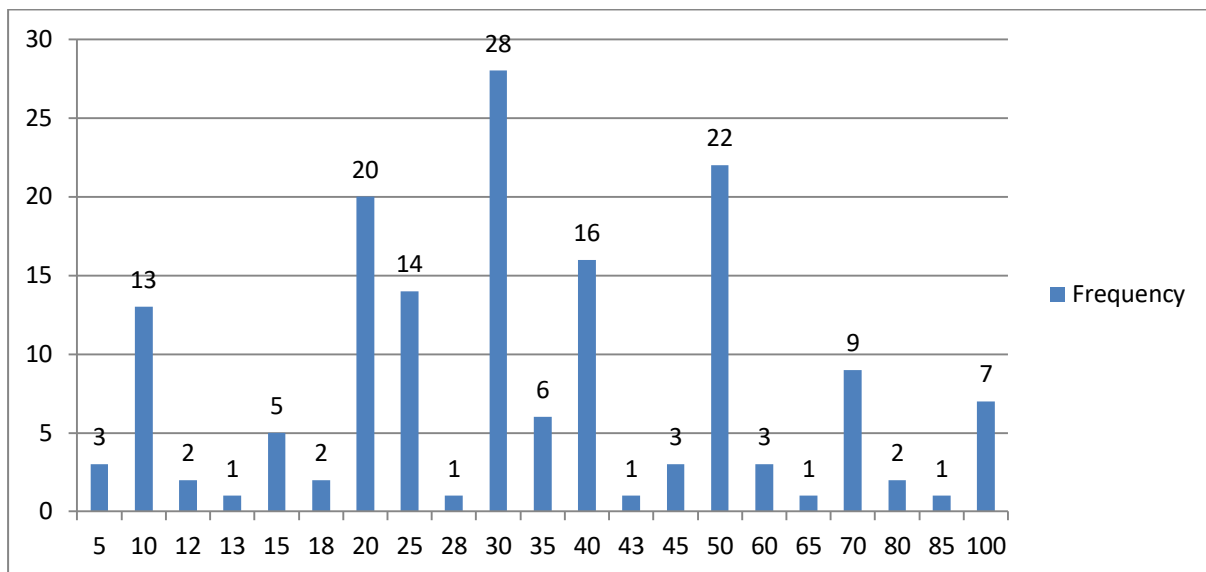
The responses to questions 6(a) and (b) show that the doctors in Malawi are heavily involved in seeing patients for at least five days a week (mostly full days).

### **6.3.7 Highest number of patients seen on busiest day**

Data on the number of patients the doctors see on their busiest day was collected using responses to question 7 (On your busiest day, on estimation the highest number of patients that you see?) in the questionnaire. This question requested the doctors to indicate the highest number of patients they saw on their busiest day. The findings for question 7 are reported with N=160 as 11 doctors did not answer this question. The results show that the highest number of patients a doctor saw per day was indicated as 100 patients<sup>6</sup> per day and the lowest number was 5 patients per day. The mean number of patients seen per day calculated from all 160 responses was 37 patients and the standard deviation was 22 patients. Figure 6.5 below shows a graph of the highest number of patients that doctors see against the number of doctors who indicated that they see that number of patients. The responses did not distinguish between doctors who see patients on a full day basis and those who see patients half a day.

<sup>6</sup> It should be noted that the questionnaire did not limit the definition of the of the word ‘seeing patients’ to one on one consultations in the consultation room hence some doctors also referred to their moving around the congested wards of their hospitals as ‘seeing patients’. More patients are seen in the latter as little time is taken per patient.

**Figure 6.5 The number of patients doctors see per day<sup>7</sup>**



**Number of patients that doctors see per day**

### 6.3.8 Type of hospital of primary employment

The assumption in the literature is that the type of hospital determines its capacity to provide for resources such as information resources for its doctors on the one hand (Lwanda, 2007). On the other hand, the literature assumes that the more the number of hospitals the doctor works at, the more the workload and the less the time they would have for information searching (Abeyseena *et al.*, 2010). Data on the type of hospitals where doctors were primarily employed was collected using responses to question 8 (In which type of hospital are you primarily employed?) of the questionnaire. The doctors were given six options to choose from namely: government hospital/health centre – urban, government hospital/health centre – rural, private hospital – urban, private hospital – rural, <sup>8</sup>CHAM hospital – urban, and CHAM hospital – rural. Findings for this question are reported with N=169 doctors as 4 doctors left it blank. The results show that 157 doctors (92.8% of N) indicated that they worked in an urban government hospital, 4 doctors (2.4% of N) indicated that they worked in a rural government hospital, 5 doctors (3% of N) indicated that they worked at an urban private hospital, 1 doctor (0.6% of N) reported that he/she worked at an urban CHAM hospital and 2 doctors (1.2%) indicated that they worked at a rural CHAM hospital.

<sup>7</sup> Please note that the Y axis represents the number of doctors see who indicated that they see that number of patients while the X axis represents the number of patients themselves.

<sup>8</sup> CHAM hospitals are private hospitals under the Christian Hospital Association of Malawi (CHAM) and they are co-funded and co-managed by both the private and the public sector.

## **6.4. EVIDENCE-BASED MEDICINE**

This section presents the results from question 9 (Please indicate your awareness of evidence-based medicine (EBM) and whether you apply evidence-based medicine (EBM) practice by making the most appropriate options), question 10 (Evidence-based medicine is said to be a health delivery approach that has the potential to improve the health delivery system of developing countries like Malawi. Please rate your opinion on this statement by ticking the most appropriate option) and question 11 (Will you please rate the extent to which the following are barriers to your application of evidence-based medicine (EBM) to your clinical duties) of the questionnaire on EBM namely; EBM awareness (question 9a), EBM training (question 9b), EBM application (question 9c), doctors' opinion on EBM as a health delivery approach (question 10) and doctors' assessment of EBM barriers (question 11).

### **6.4.1 EBM awareness, training and application**

#### *EBM awareness*

Question 9(a) from the questionnaire asked the doctors to indicate whether they were aware of evidence-based medicine (EBM) or not; they could answer 'yes' or 'no'. The findings of question 9(a) are reported with N=157 because 16 doctors did not answer it. The results show that 147 doctors (93.6% of N) indicated that they were aware of EBM and 10 doctors (6.4% of N) indicated that they had never heard about EBM.

#### *EBM training*

Question 9(b) from the questionnaire asked the doctors to indicate whether they were trained in EBM or not. The findings of question 9(b) are reported with N=156 since 17 doctors did not answer it. The results show that 93 doctors (59.6% of N) were trained in EBM, and 63 doctors (40.4% of N) had never been trained in EBM.

#### *Application of EBM*

Question 9(c) from the questionnaire asked the doctors to indicate whether they applied EBM in their medical practice or not. The findings of question 9(c) are reported with N=160 as 10 doctors did not answer it. The results show that 142 doctors (88.8% of N) applied EBM in their medical practice, and 18 doctors (11.2% of N) had never applied EBM in their medical practice.

### **6.4.2 Doctors' opinion on EBM as a health delivery approach**

Question 10 from the questionnaire (Appendix 1) asked the doctors to give their opinion on the statement that: 'Evidence-based medicine is said to be a health delivery approach that has the potential to improve the health delivery system of developing countries like Malawi.' The

optional answers were; 1) strongly agree, 2) disagree, 3) agree, 4) strongly agree and the doctors were also asked to explain the reason for their selected answer. The findings of question 10 are reported with N=168 as 5 doctors did not answer it. The results show that 14 doctors (8.3% of N) strongly disagreed with the statement, 2 doctors (1.2% of N) disagreed with the statement, 79 doctors (47% of N) agreed with the statement, 73 doctors (43.5% of N) strongly agreed with the statement. The aggregated results for agreed and strongly agreed show that 152 doctors (90.5% of N) agreed and strongly agreed that evidence-based medicine is a health delivery approach that has the potential to improve the health delivery system of developing countries like Malawi.

The doctors were also asked to explain the reasons for the answers they gave in question 10 above. There were 92 doctors who responded to this question and 81 doctors left it blank. The doctors gave qualitative responses because they were responding to a question that was open ended. The responses reflected different issues and the list was longer than expected but a summary of these has been included in chapter 7 which is on qualitative results.

#### **6.4.3 Barriers to application of EBM**

Question 11 from the questionnaire (Appendix 1) asked the doctors to indicate the extent to which the following were barriers to their application of EBM in their clinical duties: poor EBM knowledge, lack of information, lack of training in information searching and lack of time. The doctors were further requested to specify any other barriers that they encountered apart from these. Under each of the above barriers the doctors were also requested to indicate if they had no problem with it, if it was somewhat a barrier, if it was a significant barrier or if it prevented application of EBM. The outcomes of the responses to question 11 are summarised in Table 6.4 below.

**Table 6.4 Doctors in Malawi and barriers to the application of EBM<sup>9</sup>**

<b>Suggested barrier</b>	<b>Have no problem</b>	<b>Somewhat a barrier</b>	<b>Significant barrier</b>	<b>Prevented EBM</b>
Lack of time	49	56	42	26
Poor EBM knowledge	59	53	44	14
Lack of information	45	39	51	38
Lack of training in information searching	59	39	45	28

<sup>9</sup> The results in Table 6.4 are presented as raw figures i.e. the exact number of doctors who responded.

The detailed responses from 11(a) to (d) are described below:

a) Poor EBM knowledge

Data on the extent to which poor EBM knowledge was a barrier was collected using question 11(a) whose findings are reported with N=170. The results show that 59 doctors (34.7% of N) indicated that poor EBM knowledge was not a barrier to their application of EBM in their clinical practice, 53 doctors (31.2% of N) indicated that poor EBM knowledge was somewhat a barrier, 44 doctors (25.9% of N) indicated that poor EBM knowledge was a significant barrier of EBM application, 14 doctors (8.2% of N) indicated that poor EBM knowledge prevented application of EBM in their clinical practice.

b) Lack of information resources

Data on the extent to which lack of information resources was a barrier was collected from question 11(b) from the questionnaire. The findings of this question was reported with N=173 as it was answered by all doctors who returned the questionnaire. The results show that 45 doctors (26% of N) indicated that lack of information resources was not a barrier to their application of EBM in their clinical practice, 39 doctors (22.5% of N) indicated that lack of information resources was somewhat a barrier, 51 doctors (29.5% of N) indicated that lack of information resources was a significant barrier of EBM application in their clinical practice, 38 doctors (22% of N) indicated that poor EBM knowledge prevented application of EBM in their clinical practice.

c) Lack of training in information searching

Data on the extent to which lack of training in information searching was a barrier was collected using question 11 (c) from the questionnaire. The results for this question are reported with N=171 as 2 doctors left it blank. The results show that 59 doctors (34.5% of N) indicated that lack of training was not a barrier that hindered their application of EBM, 39 doctors (22.8% of N) reported that lack of training was somewhat a problem in their application of EBM, 45 doctors (26.3%) indicated lack of training was a significant barrier to their application of EBM and 28 doctors (16.4% of N) indicated that lack of training prevented them from applying EBM in their clinical duties.

d) Lack of time

Question 11(d) from the questionnaire collected responses from the doctors on whether they thought lack of time was a barrier to their application of EBM in their clinical duties. Findings for question 11(d) are reported with N=173 as it was answered by all 173 doctors who returned their questionnaires. The results show that 49 doctors (28.3% of N) indicated that they had no problem with lack of time, 56 doctors (32.4% of N) indicated that lack of

time was somewhat a barrier, 42 doctors (24.3% of N) indicated that lack of time was a significant barrier and 26 doctors (15% of N) indicated that lack of time prevents their application of EBM.

From the summaries in Table 6.5 below, it is clear that many doctors in Malawi are aware of and think that they are conversant with the EBM steps. Table 6.5 also shows that there are more doctors that look at barriers that were listed as somewhat a barrier, and significant barrier and consider them as having the potential to prevent application of EBM in their practice.

The doctors were also asked to explain if there were any barriers to the application of EBM that they had in their minds besides the ones that were listed. There were only 2 doctors (1.2% of N) who gave additional explanations. The first additional explanation was that the doctors fail to apply EBM because of lack of supporting equipment that goes together with EBM itself. The second additional explanation was that there was simply no motivation in Malawi for the application of EBM.

## **6.5 INFORMATION BEHAVIOUR PRACTICES AND EBM**

This section presents results on how the doctors appraised themselves on the five steps of EBM (question 12 – Please rate your skills in applying the five main steps of evidence-based medicine (EBM) by ticking the appropriate option for each of the steps below), whether EBM formed part of the policy at the hospitals where they were working (question 13 – Does evidence-based (EBM) form part of the operational policy of the hospital where you have your main employment), whether the EBM policy stimulated the doctors' need for information and their willingness to look for it (question 14 – If your answer to the question 13 is yes, to what extent does the hospital operating policy on evidence-based medicine (EBM) stimulate your need for information and willingness to look for information).

### **6.5.1 Doctors and the five steps of EBM**

Data on the extent to which the doctors were conversant with the five main steps of EBM was collected using question 12 from the questionnaire. The five main steps of EBM were presented as: framing questions, identifying literature, assessing the quality of information, summarising evidence gathered, and interpreting the findings so as to inform clinical decisions. The doctors were further asked to rate their skills in applying these five EBM steps and under each step the doctors were further requested to indicate whether they thought they were, very good, good, mediocre, and poor. All 173 doctors (100%) who returned the questionnaires answered question 12(a) to (e) and findings are thus presented with N=173.



The detailed results are presented below and a summary of the results from (a) to (e) is given in Table 6.5.

**Table 6.5 Doctors in Malawi and their self-rating of five steps of EBM<sup>10</sup>**

<b>EBM step</b>	<b>Very good</b>	<b>Good</b>	<b>Mediocre</b>	<b>Poor</b>
Framing questions	46	100	22	5
Identifying literature	51	89	27	6
Assessing the quality of information	46	84	36	7
Summarising evidence gathered	40	101	30	2
Interpreting the findings	48	98	22	5

a) Framing questions

Question 12(a) asked the doctors to rate their skills in framing questions. The results show that 46 doctors (26.6% of N) indicated that they were very good at framing the questions, 100 doctors (57.8% of N) indicated that they were good at framing the questions, 22 doctors (12.7% of N) indicated that they were mediocre at framing questions and 5 doctors (2.9% of N) indicated that they were poor at framing questions. The aggregate results for very good and good show that 146 doctors (84% of N) were either very good or good at framing questions.

b) Identifying literature

The results show that 51 doctors (29.5% of N) indicated that they were very good at identifying the literature, 89 doctors (51.5% of N) indicated that they were good at identifying the literature, 27 doctors (15.6% of N) indicated that they had mediocre performance at identifying literature and 6 doctors (3.4% of N) indicated that they were poor at identifying literature. The aggregate results for very good and good show that 140 doctors (81% of N) considered themselves to be either very good or good at identifying literature.

c) Assessing the quality of information

The results show that 46 doctors (26.6% of N) indicated that they were very good at assessing the quality of information, 84 doctors (48.6% of N) indicated that they were good at assessing the quality of information, 36 doctors (20.8%) indicated that they had mediocre performance at assessing the quality of information and 7 doctors (4%) indicated that they were poor at

<sup>10</sup> Table 6.5 compares raw results i.e. exact number of doctors.

assessing the quality of information. The aggregate results for very good and good show that 130 doctors (75.2% of N) were either very good or good at assessing the quality of information.

d) Summarising the evidence gathered

The results show that 40 doctors (23.1% of N) indicated that they were very good at summarising the gathered evidence, 101 doctors (58.4% of N) indicated that they were good at summarising the gathered evidence, 30 doctors (17.3% of N) indicated that they had mediocre performance at summarising the gathered evidence and 2 doctors (1.2% of N) indicated that they were poor at summarising the gathered evidence. The aggregate results for very good and good show that 141 doctors (81.5% of N) were either very good or good at framing questions.

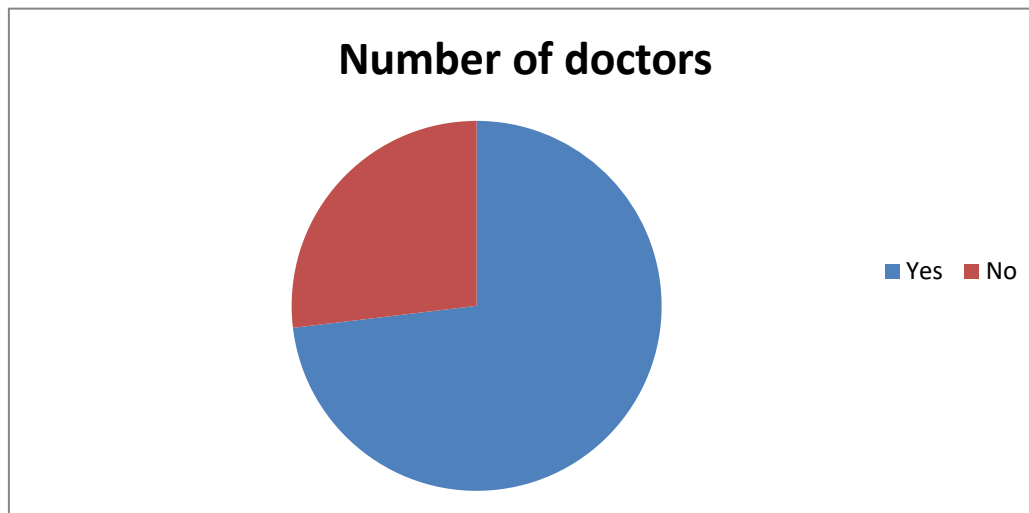
e) Interpreting the findings so as to inform the clinical decisions

The results show that 48 doctors (27.7% of N) indicated that they were very good at interpreting the findings so as to inform the clinical decisions, 98 doctors (56.7% of N) indicated that they were good at interpreting the findings so as to inform the clinical decisions, 22 doctors (12.7% of N) indicated that they had mediocre performance at interpreting the findings so as to inform the clinical decisions and 5 doctors (2.9%) indicated that they were poor at interpreting the findings so as to inform the clinical decisions. The aggregate results for very good and good show that 146 doctors (84.4% of N) were either very good or good at interpreting the findings so as to inform clinical decisions.

### **6.5.2 Information needs and EBM policies**

Data for the question on the relationship between information needs and EBM policies were sourced from both Question 13 of the questionnaire. The rationale behind question 13 hinges on suggestions from the literature discussed in Chapter 3 that EBM policies could influence the way in which doctors recognise and define their information needs. The purpose was to determine whether the hospitals where the doctors were working had EBM policies. Question 13 specifically asked the doctors whether EBM was part of the operational policy of the hospitals which were their main working stations. They could answer yes or no. Findings for this question are reported with N=171. The results show that 125 doctors (73.1% of N) indicated that EBM formed part of the operational policy of the hospital of their main employment while 46 doctors (26.9%) indicated that it was not part of the operational policy of the hospital of their main employment. Figure 6.6 is a pie graph showing acceptance of EBM as the operational policy of the participating hospitals in response to question 13.

**Figure 6.6 Pie graph showing acceptance of EBM as the operational policy of the participating hospital**



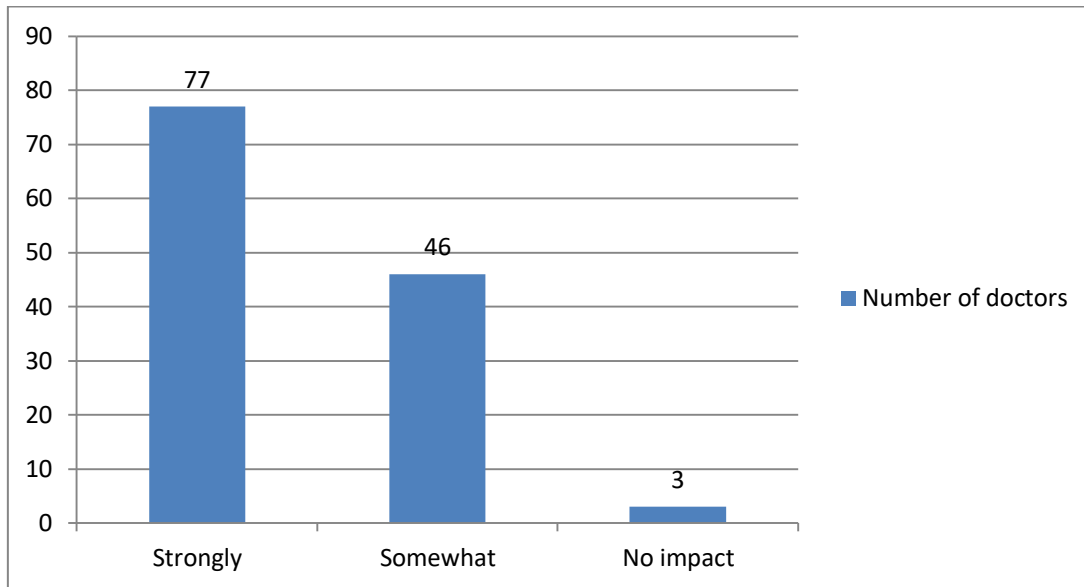
### **6.5.3 Extent of EBM as a policy influences doctors' information needs**

The assessment of EBM as a stimulator of the doctors' information seeking behaviour in the surveyed hospitals (i.e. question 14 from the questionnaire) was a follow up question to the doctors who indicated that EBM was an operational policy in their hospitals (see section 6.6.1). Question 14(a) requested the doctors to specifically indicate the extent to which EBM stimulated their need for information. Question 14(b) requested the doctors to indicate the extent to which EBM stimulated their willingness to look for information. The doctors were asked to respond to both question 14(a) and (b) with the following options: strongly, somewhat, no impact.

#### **a) Need for information and EBM**

The findings to question 14 (a) from the Questionnaire (Appendix 1) are reported with N=126. The results show that 77 doctors (61.1% of N) indicated that EBM was a policy that strongly influenced their need for information, 46 doctors (36.5% of N) indicated that EBM was an operational policy that somewhat influenced their need for information and 3 doctors (2.4% of N) indicated that EBM was an operational policy that had no impact on their need for information. Figure 6.7 shows a graphic representation of the results on the relationship between need for information and EBM as an operational policy.

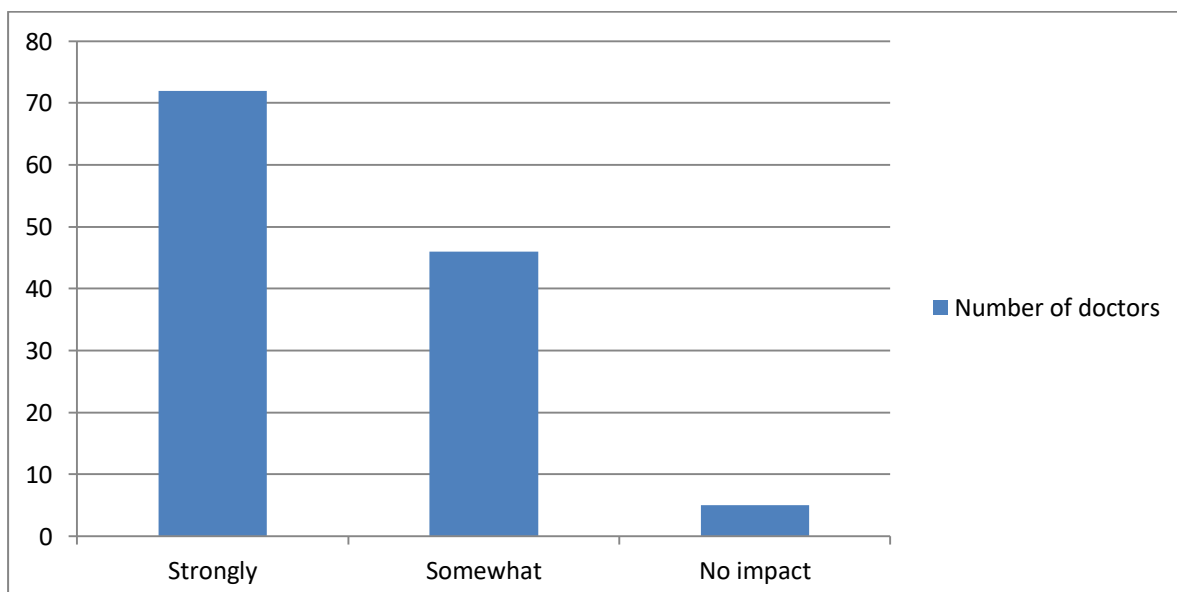
**Figure 6.7 Influence of EBM policy on needs for information**



**b) Willingness to look for information and EBM**

Question 14(b) from the questionnaire wanted to find out from the doctors whether the hospital the doctors were operating at had an EBM policy that stimulated their willingness to look for information. Findings to question 14(b) are reported with N=123. The results show that 72 doctors (58.5% of N) indicated that EBM as a policy strongly influenced their willingness to look for information, 46 doctors (37.4% of N) indicated that EBM as an operational policy somewhat influenced their willingness to look for information and 5 doctors (4.1% of N) indicated that EBM as an operational policy had no impact on their willingness to look for information. Figure 6.8 shows a graph on the influence of EBM on the willingness to look for information.

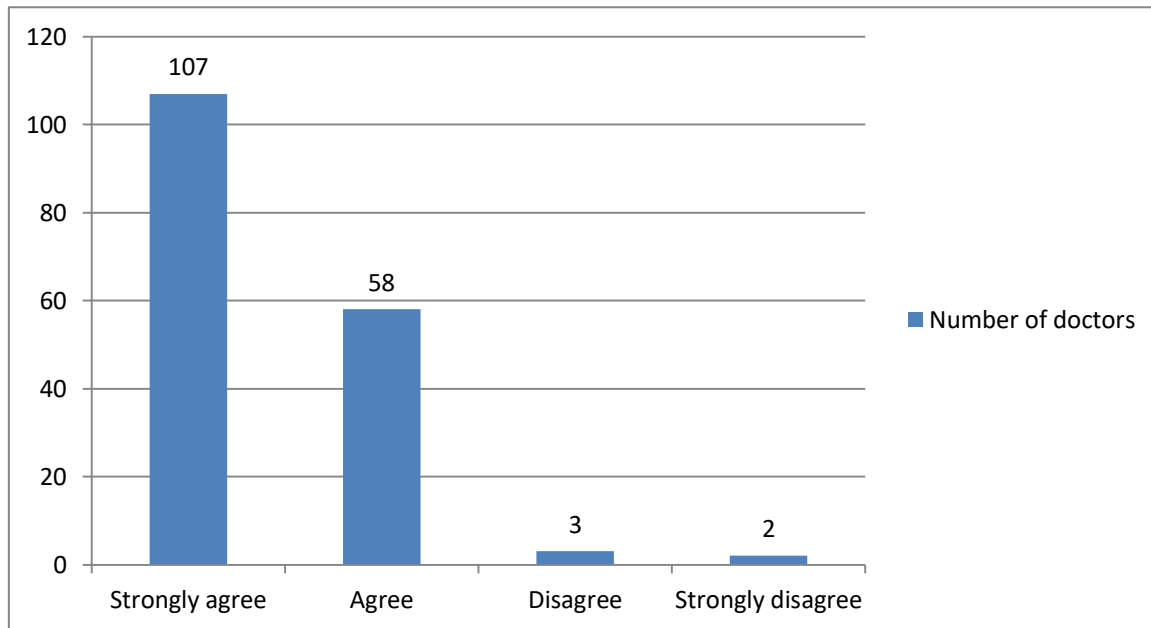
**Figure 6.8 The influence of EBM on doctors' willingness to look for information**



#### **6.5.4 Information behaviour practices and EBM**

Question 15 from the questionnaire was - To what extent do you agree with the following statement: **‘The understanding of the Malawi doctor’s ability to seek and use information has the potential to inform evidence-based medicine practices that can improve the health delivery service’**. A four point Likert scale was used to record responses: strongly agree, agree, disagree, and strongly disagree. Findings for question 15 are reported with N=170 as 3 doctors did not answer it. The results show that 107 doctors (62.9%) strongly agreed with the statement, 58 doctors (34.1%) agreed with the statement, 3 doctors (1.8%) disagreed with the statement and 2 doctors (1.2%) strongly disagreed with the statement. The aggregate results between strongly agreed and agreed show that 165 doctors (97.1%) strongly agreed and agreed with the statement that ‘the understanding of the Malawi doctor’s ability to seek and use information has the potential to inform evidence-based medicine practices that can improve the healthy delivery service’. Figure 6.9 is a bar graph that reflects the doctors’ perceptions on the influence of information behaviour on EBM and health delivery.

**Figure 6.9 Perceptions on the potential of doctor’s information behaviour practices on EBM and health delivery**



## **6.6 INFORMATION SEEKING PREFERENCES**

This section presents responses on the information seeking preferences of the doctors and it focuses on barriers to information for clinical duties (question 16 – To what extent do you experience the following barriers when seeking information for your clinical duties? (Tick the most appropriate option for each barrier), doctors’ use of various types of information sources (question 17 – Please indicate how frequently you use the following sources of information by selecting the most appropriate option for each source), self-rating on use of electronic sources of information (question 18 – Please indicate how you have in the past used the following sources of information ticking the appropriate option against each other), self-rating of own information searching skills (question 19 – Please rate your skills in using databases (e.g. HINARI, EBSCO, PUBMED, etc)) and frequency of use of various types of clinical information needs (question 20 – How often do you need information for the following reasons? Please tick the appropriate option).

### **6.6.1 Experience of different types of barriers**

Data for the question on the information seeking preference was sourced from the responses to question 16 of the questionnaire and the questions under information seeking on the interview schedule with key informants (Appendix 2) whose results are reported in chapter 7. Question 16 in the questionnaire collected quantitative data on barriers or challenges to the information seeking process experienced by doctors. This question sought to understand the

extent to which doctors in Malawi experienced different types of barriers when seeking information for their clinical duties. Based on the literature review in Chapter 3 and 4 ten barriers were suggested and these are: heavy workload, inability to identify appropriate search terms, lack of awareness of information sources, assessing the quality of information, lack of access to the Internet, lack of access to the information sources, complexity of interpreting the gathered evidence into clinical decision, lack of training in information retrieval, lack of training in evidence-based medicine, and lack of experience in evidence-based medicine. The doctors had to rate each barrier on a four point Likert scale as: not a barrier, a minor barrier, a moderate barrier or a major barrier. The summary for the responses are presented in Table 6.6 where the three most identified barriers or challenges of the information seeking of doctors in Malawi were identified as: heavy workload, lack of access to the Internet and lack of access to other information sources. The results summarised in the table are arranged in order of the severity of the barrier (i.e. starting with those indicated as major barriers).

**Table 6.6 Barriers to information seeking (from most to the least identified)**

<b>Ranked barriers</b>	<b>Number of doctors who thought it was a major barrier (N = 173)</b>
1. Heavy workload	66
2. Lack of access to the Internet	53
3. Lack of access to other information sources	35
4. Lack of awareness of information sources	25
5. Lack of training in EBM	17
6. Assessing the quality of information	14
7. Lack of training in information retrieval	11
8. Lack of experience in EBM	11
9. Identifying appropriate search terms	10
10. Complexity of interpreting the gathered evidence into clinical decisions	6

It is interesting to note that identifying appropriate search terms, complexity of interpreting the gathered evidence into clinical decisions and lack of training in EBM were not considered as major barriers as demonstrated by the aggregated results. The detailed results of question 16 (a) to (k) of the questionnaire are discussed below:

a) Workload

All 173 doctors (N=173) who returned the questionnaire rated heavy workload as a barrier. The results show that 66 doctors (38.2% of N) indicated that workload was a major barrier, 52 doctors (30.1% of N) indicated that workload was a moderate barrier, 29 doctors (16.7% of N) indicated that workload was a minor barrier and a further 26 doctors (15% of N) said it

was not a barrier. The aggregated results for major barrier and moderate barrier show that 118 (68.3% of N) doctors indicated that workload was a major or moderate barrier.

b) Identifying appropriate search terms

Findings for question 16(b) is reported with N=172 doctors. Only one respondent did not rate the identification of appropriate search terms. The results show that 64 doctors (37.2% of N) thought identifying appropriate search terms was not a barrier, 60 doctors (34.9% of N) indicated that it was a minor barrier, 38 doctors (22.1% of N) reported it was a moderate barrier and 10 doctors (5.8% of N) said it was a major barrier. The aggregated results for major barrier and moderate barrier show that 48 doctors (27.9% of N) indicated that identifying appropriate search terms was a major or moderate barrier.

c) Lack of awareness of information resources

There were 170 doctors who responded to question 16(c) hence findings are reported with N=170 doctors. The results show that 57 doctors (33.5%) indicated that lack of awareness of information sources was not a barrier, 58 doctors (34.1%) indicated that it was a minor barrier, 30 doctors (17.7%) indicated that it was a moderate barrier and 25 doctors (14.7%) said it was a major barrier. The aggregated results for major barrier and moderate barrier show that 55 doctors (32.3% of N) indicated that lack of awareness of information resources was a major or moderate barrier.

d) Assessing the quality of information

Findings for question 16(d) are reported with N=171 doctors. The results show that 63 doctors (36.8% of N) indicated that assessing the quality of information was not a barrier, 58 doctors (33.9%) pointed that it was a minor barrier, 36 doctors (21.1% of N) said that it was a moderate barrier and 14 doctors (8.2%) indicated that it was a major barrier. The aggregated results for major barrier and moderate barrier show that 50 doctors (29.3% of N) indicated that assessing the quality of information was a major or moderate barrier.

e) Lack of access to the Internet

There were 172 doctors who responded to the question 16(e) on lack of access to the Internet and results are therefore reported with N=172 doctors. The results show that 55 doctors (32%) indicated that lack of access to the Internet was not a barrier, 25 doctors (14.6% of N) indicated that it was a minor barrier, 39 doctors (22.7% of N) indicated that it was a moderate barrier and 53 doctors (30.8%) said it was a major barrier. The aggregated results for major barrier and moderate barrier show that 92 doctors (53.4% of N) indicated that lack of access to the Internet was a major or moderate barrier.



f) Lack of access to other information resources

The findings for question 16(f) on lack of access to other information sources are reported with N=172 doctors. The results show that 40 doctors (23.3% of N) indicated that lack of access to other information sources was not a barrier, 40 doctors (23.3% of N) indicated that it was a minor barrier, 57 doctors (33.1% of N) indicated that it was a moderate barrier and 35 doctors (20.3%) said it was a major barrier. The aggregated results for major barrier and moderate barrier show that 92 doctors (53.4% of N) indicated that lack of access to other information resources was a major or moderate barrier.

g) Complexity of interpreting the gathered evidence into clinical decision making

The findings of question 16(g) on complexity of interpreting the gathered evidence or information into clinical decision making are reported with N=172 doctors. The results show that 53 doctors (30.8%) indicated that complexity of interpreting the gathered evidence into clinical decisions was not a barrier, 71 doctors (41.3% of N) reported that it was a minor barrier, 42 doctors (24.4%) indicated that it was a moderate barrier and 6 doctors (3.5%) indicated that it was a major barrier. The aggregated results for major barrier and moderate barrier show that 48 doctors (27.9% of N) indicated that complexity of interpreting the gathered evidence into clinical decision making was a major or moderate barrier.

h) Lack of training in information retrieval

The question on whether lack of training in information retrieval was a barrier was answered by 172 doctors i.e. N=172. The results show that 67 doctors (38.9%) indicated that lack of training in information retrieval was not a barrier, 51 doctors (29.7%) indicated that it was a minor barrier, 43 doctors (25%) indicated that it was a moderate barrier and 11 doctors (6.4%) indicated that it was a major barrier. The aggregated results for major barrier and moderate barrier show that 54 doctors (31.4% of N) indicated that lack of training in information retrieval was a major or moderate barrier.

i) Lack of training in evidence-based medicine

The findings for question 16(i) are reported with N=171 doctors. The results show that 69 doctors (40.1% of N) indicated that lack of training in evidence-based medicine was not a barrier, 57 doctors (33.1% of N) indicated that it was a minor barrier, 28 doctors (16.3%) indicated that it was a moderate barrier and 18 doctors (10.5%) indicated that it was a major barrier. The aggregated results for major barrier and moderate barrier show that 46 doctors (26.8% of N) indicated that lack of training in evidence-based medicine was a major or moderate barrier.

j) Lack of experience in evidence-based medicine

The findings for question 16 (j) on whether lack of experience in evidence-based medicine was a barrier are reported with N=161 doctors. The results show that 70 doctors (43.2% of N) indicated that lack of experience in evidence-based medicine was not a barrier, 53 doctors (32.7%) indicated that it was a minor barrier, 27 doctors (16.7% of N) indicated that it was a moderate barrier and 11 doctors (7.4% of N) indicated that it was a major barrier. The aggregated results for major barrier and moderate barrier show that 38 doctors (23.1% of N) indicated that lack of experience in evidence-based medicine is a major or moderate barrier.

k) Other explanations

The doctors were given a choice to explain anything they wanted to say on barriers besides what was covered in the list of barriers in the questionnaire. Only one doctor answered that “the question of barriers did not arise because doctors were engaged in a routine job where they treat routine disease and their knowledge and experience gives them all the answers they want”.

### **6.6.2 Use of various types of information sources**

Quantitative data for understanding the nature of the information sources that the doctors use was taken from question 17 of the questionnaire. The data on the nature of information sources wanted to find out how often the doctors used ten selected information sources, namely: specialists senior to you (i.e. human sources), printed books, eBooks, printed journals, Ejournals, medical databases e.g. UpToDate, Pubmed, Medline, etc., Google Scholar, Google or other search engines, and other sources that the doctors had to specify. The doctors were requested to indicate under each of the above listed information sources if they used it: daily, several times a week, once a week, once or twice a month, or never. The findings on sources in Table 6.7 below are arranged according to frequency of use on a daily basis. Google and other search engines are the sources used most on a daily basis, with consultation with senior specialists in second place. It is not surprising that the printed journals are the least used because none of the hospitals visited indicated that they subscribed to printed journals. Another explanation could be that print journals are eclipsed by electronic journals as there is now more preference by information seekers for the latter.

**Table 6.7 Doctors and how they use the information sources**

<b>Information source</b>	<b>Daily</b>	<b>Several times a week</b>	<b>Once a week</b>	<b>Once or twice a month</b>	<b>Never</b>
Google or other search engines	94	52	5	9	4
Specialists senior to you	80	45	12	23	6
Medical databases	46	52	29	34	10
Printed books	33	56	33	39	9
Ebooks	32	29	18	28	18
Google Scholar	25	29	13	35	70
E-journals	13	43	26	62	25
Printed journals	5	16	13	56	80

a) Specialists senior to you

Findings for question 17 (a) of the questionnaire which asked the doctors to indicate how often they contacted specialists senior to them as an information source are reported with N=166. The results show that 80 doctors (48.2% of N) indicated that they consulted specialists senior to them daily, 45 doctors (27.1% of N) said they consulted specialists senior to them several times a week, 12 doctors (7.2% of N) reported that they consulted specialists senior to them once a week, 23 doctors (13.9% of N) consulted specialists senior to them once or twice a month, and 6 doctors (3.6% of N) never consulted specialists senior to them. The aggregate result for daily and several times a week show that 125 doctors (75.3% of N) use specialists senior to them as information sources daily or several times a week.

b) Printed books

Findings on question 17(b) of the questionnaire which asked the doctors to indicate how often they used printed books as information sources are reported with N=170 doctors. The results show that, 33 doctors (19.4% of N) used printed books daily, 56 doctors (32.9% of N) used the printed books several times a week, 33 doctors (19.4% of N) used the printed books once a week, 39 doctors (22.9% of N) used the printed books once or twice a month, and 9/173 (5.4%) never used printed books. The aggregate result for daily and several times a week show that 89 doctors (52.3% of N) use printed books as information sources daily or several times a week.

c) E-books

Findings for question 17(c) of the questionnaire are reported with N=168 doctors. The question asked the doctors to indicate how often they used e-Books as information sources. The results show that 32 doctors (19%) of the doctors used e-books daily, 72 doctors (42.9%) used eBooks several times a week, 18 doctors (10.7% of N) used e-books once a week, 28 doctors (16.7%) used e-books once or twice a month, and 18 doctors (10.7%) never used e-books. The aggregate result for daily and several times a week show 104 doctors (61.9% of N) use e-books as information sources daily or several times a week.

d) Printed journals

Question 17(d) of the questionnaire (Appendix 1) asked the doctors to indicate how often they used printed journals as an information source and its results are reported with N=170 doctors. The results show that 5 doctors (2.9% of N) used printed journals daily, 16 doctors (9.4%) used the printed journals several times a week, 13 doctors (7.7% of N) used the printed journals once a week, 56/173 (32.9% of N) used the printed journals once or twice a month, and 80 doctors (47.1%) never used printed journals. The aggregate result for daily and several times a week show that 21 doctors (12.3% of N) used printed journals as information sources daily or several times a week.

e) E-journals

Findings to question 17(e) of the questionnaire which asked the doctors to indicate how often they used e-journals as an information source are reported with N=169. The results show that 13 doctors (7.7% of N) used e-journals daily, 43 doctors (25.4%) used e-journals several times a week, 26 doctors (15.4% of N) used e-journals once a week, 62 doctors (36.7% of N) used e-journals once or twice a month, and 25 doctors (14.8% of N) never used e-journals. The aggregate result for daily and several times a week show 56 doctors (33.1% of N) used e-journals as information sources daily or several times a week.

f) Medical databases e.g. UpToDate, Pubmed, Medline

The results for question 17(f) of the questionnaire which asked the doctors to indicate how often they contacted medical databases e.g. UpToDate, Pubmed, Medline as an information source are reported with N=171. The results show that 46 doctors (26.9% of N) used medical databases daily, 52 doctors (30.4% of N) used the medical databases several times a week, 29 doctors (17% of N) used the medical databases once a week, 34 doctors (19.9%) used medical databases once or twice a month, and 10 doctors (5.8% of N) never used a medical database. The aggregate result for daily and several times a week show that 98 doctors (57.3% of N) used medical databases e.g. UpToDate, Pubmed, Medline as information sources daily or several times a week.

#### g) Google Scholar

Findings for question 17(g) of the questionnaire are reported with N=172. The question asked the doctors to indicate how often they contacted Google Scholar for sourcing information. The results show that 25 doctors (14.5% of N) used Google Scholar daily, 29 doctors (16.9% of N) used Google Scholar several times a week, 13 doctors (7.6%) used Google Scholar once a week, 35 doctors (20.3% of N) used Google Scholar once or twice a month, and 70 doctors (40.7% of N) never used Google Scholar. The aggregate result for daily and several times a week show that 54 doctors (31.4% of N) used Google Scholar as their information source daily or several times a week.

#### h) Google or other search engines

Findings for question 17(h) of the questionnaire are reported with N=164. The question asked the doctors to indicate how often they used Google or other search engines as an information source. The results show that 94 doctors (57.3% of N) used Google or other search engines daily, 52 doctors (31.7% of N) used Google or other search engines several times a week, 5 doctors (3% of N) used Google or other search engines once a week, 9 doctors (5.6% of N) used Google or other search engines once or twice a month, and 4 doctors (2.4% of N) never used Google or other search engines. The aggregate result for daily and several times a week show 146 doctors (89% of N) used Google or other search engines as information sources daily or several times a week.

The fact that the aggregated results for daily and several times a week show that Google or other search engines are the most popular sources of information with 146 doctors searching them show that the majority of doctors desire electronic sources. This is supported by the fact that the aggregated results for daily and several times a week shows that 104 doctors indicated that they prefer eBooks daily and several times a week while 89 doctors used printed books daily or several times a week. The aggregated result again shows that 56 doctors used e-journals daily or several times a week while only 21 doctors used printed journals daily or several times a week.

### **6.6.3 Self rating on use of electronic databases**

Data for understanding the information searching skills of the doctors was collected from the responses to question 18 of the questionnaire. Question 18 requested the doctors to indicate how they had in the past searched and used the following databases: Medical Literature

Analysis and Retrieval System Online (commonly known as MEDLINE or MEDLARS Online), EMBASE (Excerpta Medicadata-BASE), Cochrane Library, Health Internetwork Access to Research Initiative (HINARI), Eton B Stevens Company for Information Services (commonly called EBSCO), UpToDate, Google or other general search engines, and Google Scholar. Participants were also asked to specify any other databases they had used before. For each of these databases, the doctors were further requested to indicate if: they were aware of the database, they were aware of but never used the database, they were purposive to find information, and if somebody used it on their behalf. The outcome of the responses is presented in Table 6.8. The results in the ‘unaware’ column are presented in order of the database that most doctors are unaware of.

**Table 6.8 Summary of results on doctors' searching and use of databases<sup>11</sup>**

List of databases	Unaware	Aware but never used	Purposive to find information <sup>12</sup>	Somebody used it on my behalf
EMBASE	135	23	13	0
EBSCO	114	36	16	0
MEDLINE	65	29	73	3
HINARI	38	35	91	2
UpToDate	29	30	105	5
COCHRANE	28	45	92	5
Google Scholar	27	38	88	10
Google and other search engines	3	5	161	2

The detailed results of question 18(a) to (h) of the questionnaire are elaborated below as follows:

a) MEDLINE

Findings for question 18(a) of the questionnaire (Appendix 1) are reported with N=170. The results show that 65 doctors (38.2% of N) were unaware of the MEDLINE database, 29 doctors (17.1% of N) indicated that they were aware of MEDLINE but never used it, 73 doctors (42.9% of N) indicated that they used it with the purpose to find information from MEDLINE and 3 doctors (1.8%) indicated that somebody used MEDLINE on their behalf. The aggregated results for unaware and aware but never used it, show that 94 doctors (55.3% of N) who responded to this question were unaware or were aware but had never used MEDLINE.

b) EMBASE

<sup>11</sup> Table 6.8 compares raw figures.

<sup>12</sup>It is with the purpose to find information

Findings for question 18(b) of the questionnaire (Appendix 1) are reported with N=171 doctors. The results show that 135 doctors (78.9% of N) were unaware of EMBASE, 23 doctors (13.5% of N) indicated that they were aware of EMBASE but never used it, 13 doctors (7.6% of N) indicated that they used it with the purpose to find information from EMBASE and none indicated that somebody used EMBASE on their behalf. The aggregated results for unaware and aware but never used it show that 158 doctors (92% of N) who answered this question were unaware or were aware but had never used EMBASE.

c) Cochrane Library

Findings for question 18(c) of the questionnaire are reported with N=170 doctors. The results show that 28 doctors (16.5% of N) were unaware of Cochrane Library, 45 doctors (26.5% of N) indicated that they were aware of Cochrane Library, but never used it, 92 doctors (54.1% of N) indicated that they used it with the purpose to find information from Cochrane Library and 5 doctors (2.9% of N) indicated that somebody used Cochrane Library on their behalf. The aggregated results for unaware and aware but never used it show that 73 doctors (43% of N) were unaware or were aware but had never used Cochrane Library.

d) HINARI

Findings for question 18(d) of the questionnaire (Appendix 1) are reported with N=166 doctors. The results show that 38 doctors (22.9% of N) were unaware of HINARI, 35 doctors (21.1%) indicated that they were aware of HINARI but never used it, 91 doctors (54.8%) indicated that they used it with the purpose to find information from HINARI and 2 doctors (1.2% of N) indicated that somebody used HINARI on their behalf. The aggregated results for unaware and aware but never used it show that 73 doctors (44.1% of N) were unaware or were aware but had never used HINARI.

e) EBSCO

Findings for question 18(e) of the questionnaire (Appendix 1) are reported with N=166 doctors. The results show that 114 doctors (68.7% of N) were unaware of EBSCO database, 36 doctors (21.7% of N) indicated that they were aware of EBSCO but never used it, 16 doctors (9.6% of N) indicated that they used it with the purpose to find information from EBSCO database and none indicated that somebody used EBSCO on their behalf. The aggregated results for unaware and aware but never used it show that 150 doctors (90.4% of N) were unaware or were aware but had never used EBSCO.

f) UpToDate

Findings for question 18(g) of the questionnaire (Appendix 1) are reported with N=169 doctors. The results show that 29 doctors (17.2% of N) were unaware of UpToDate database, 30 doctors (17.8% of N) indicated that they were aware of the UpToDate but never used it, 105 doctors (62.1% of N) indicated that they used it with the purpose to find information from UpToDate database and 5 doctors (3% of N) indicated that somebody used UpToDate on their behalf. The aggregated results for unaware and aware but never used it show that 59 doctors (35% of N) were unaware or were aware but had never used UpToDate.

g) Google or other general search engines

Findings for question 18(g) of the questionnaire are reported with N=171 doctors. The results show that 3 doctors (1.7% of N) were unaware of Google or other general search engines, 5 doctors (2.9% of N) indicated that they were aware of Google or other general search engines but never used any, 161 doctors (94.2%) indicated that they used it with the purpose to find information from Google or other general search engines and 2 doctors (1.2%) indicated that somebody used Google or other general search engines on their behalf. The aggregated results for unaware and aware but never used it show that 8 doctors (4.7% of N) were unaware or were aware but had never used Google or other general search engines.

h) Google Scholar

Findings for question 18(h) of the questionnaire are reported with N=163 doctors. The results show that 27 doctors (16.6%) were unaware of Google Scholar, 38 doctors (23.3%) indicated that they were aware of Google Scholar but never used it, 88 doctors (54%) indicated that they used it with the purpose to find information from Google Scholar and 10 doctors (6.1%) of the doctors indicated that somebody used Google Scholar on their behalf. The aggregated results for unaware and aware but never used it show that 65 doctors (39.9% of N) who answered this question were unaware or were aware but had never used Google Scholar.

i) Other sources

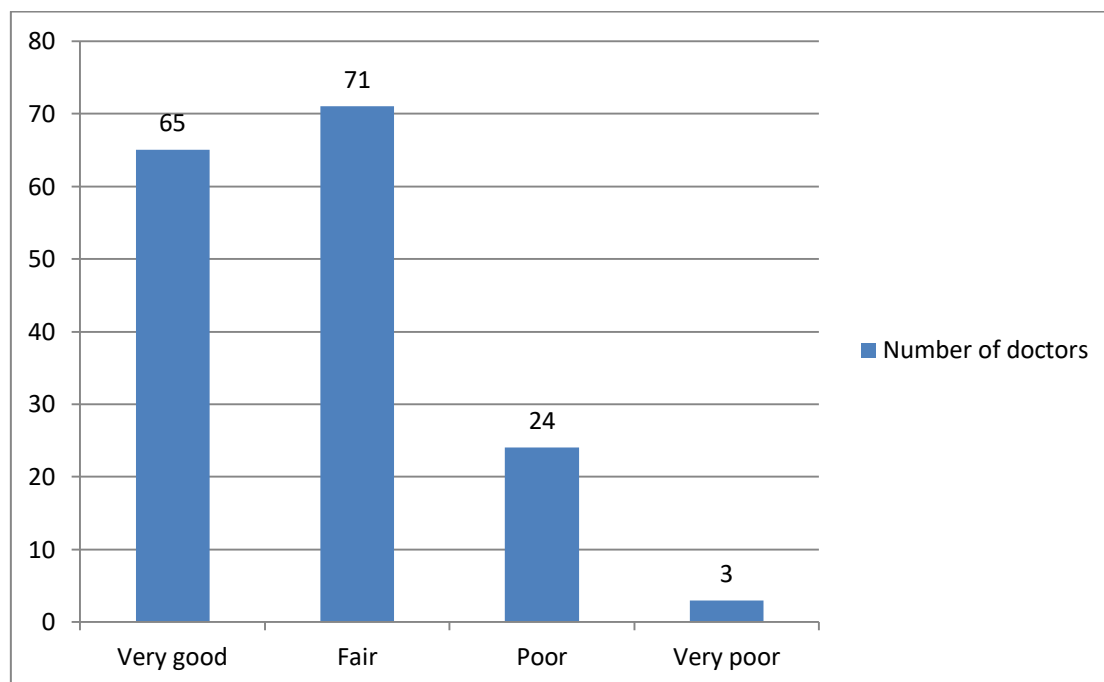
Findings for question 18(i) of the questionnaire are reported with N=15 doctors. The results show that 4 doctors (26.6% of N) indicated that they used PubMed (the free version of Medline) as a source apart from the ones listed from (a) to (h). One doctor (6.7% of N) indicated that he/she used Mayo Clinic. One more doctor (6.7% of N) indicated that he/she used Merc Manual. A further 7 doctors (46.7% of N) indicated that they used Medscape. Finally, 2 doctors (13.3% of N) indicated that they used Wikipedia as their information source.



#### 6.6.4 Doctors' own rating of their skills in using databases

Question 19 of the questionnaire requested the doctors to rate their skills in using databases such as HINARI, EBSCO and PUBMED and a four-point Likert scale was used. Doctors were given a chance to choose from: very good, fair, poor and very poor. Findings for question 19 are reported with N=163 doctors. The results show that 65 doctors (39.9% of N) rated their skills as being very good. There were 70 doctors (43.6% of N) who thought their skills were fair. These were followed by 24 doctors (14.7% of N) who rated themselves as being poor followed by 3 doctors (1.8% of N) who indicated that their skills were very poor. The combination of very good and fair results show that 135 doctors (83.5% of N), were either very good or fair in using databases. Figure 6.10 is a graph showing the results on how doctors rated their skills in using databases.

**Figure 6.10 Doctors' own rating of their skills in using databases**



#### 6.6.5 Frequency of information needs regarding clinical duties

Question 20 from the questionnaire sought to collect quantitative data on the frequency of the information needs regarding clinical duties of the doctors. Based on the review of literature in Chapter 3 and 4, six core clinical activities were selected. For each activity, participants had to rate how often they needed information for that particular activity. The activities included: making a clinical decision, patient care, patient treatment, providing information to patients, advising a colleague, and with regard to other facets of their clinical duties. A four-point Likert scale was used and doctors had the option of choosing from: never, seldom, often and

very often. The results summarised in Table 6.9 above shows that the highest number of doctors (128) often and very often needed information for clinical diagnosis. This is followed by the number of doctors (125) that needed information for patient treatment often and very often, doctors that needed information for patient care often and very often (119), and lastly doctors that needed information for providing information to patients often and very often (96).

**Table 6.9 Number of doctors and frequency of information needs regarding clinical duties<sup>13</sup>**

Type of clinical duty	How often information is needed				
	Never	Seldom	Often	Very often	Often and very often
Making clinical decision (a)	0	36	72	56	128
Patient care (b)	4	41	82	37	119
Patient treatment (c)	2	36	79	56	125
Providing information to patients (d)	8	59	68	28	96
Advising colleague (e)	8	41	85	30	115

The detailed results of question 20(a) to (e) of the questionnaire (Appendix 1) were as follows:

a) Making clinical diagnosis

Findings to question 20(a) are reported with N=164 doctors. The results show that 36 doctors (22% of N) indicated that they seldom needed information for making a clinical decision, 72 doctors (43.9% of N) indicated that they often needed information for clinical decisions and only 56 doctors (34.1% of N) indicated that they very often needed information for clinical decisions. If an aggregate is taken 128 doctors (78% of N) either often or very often needed information for clinical decisions.

b) Patient care

Findings to question 20(b) which was on doctors' needs for information for patient care are reported with N=164 doctors. The results show that 4 (2.4% of N) never needed information for patient care, 41 doctors (25% of N) seldom needed information for patient care, 82 doctors (50% of N) indicated that they often needed information for patient care and 37 doctors (22.6% of N) indicated that they very often needed information for patient care. If an aggregate is taken, 119 doctors (72.6% of N) are the ones who indicated that they needed information regarding patient care either often or very often.

<sup>13</sup> This table also compares raw figures.

c) Patient treatment

Findings for question 20(c) are reported with N=163 doctors. The results show that 2 doctors (1.2% of N) indicated that they never needed information for patient treatment, 26 doctors (15.9% of N) indicated that they seldom needed information for patient treatment and 79 doctors (48.6% of N) indicated that they often needed information for patient treatment and 56 doctors (34.3% of N) indicated that they very often needed information for patient treatment. If an aggregate is taken, 125 doctors (82.9% of N) are the ones who needed information regarding patient treatment either often or very often.

d) Providing information to patients

Findings for question 20(d) are reported with N=163 doctors. The results show that 8 doctors (4.9% of N) indicated that they never experienced a need to provide information to patients, 59 doctors (36.2% of N) indicated that they seldom experienced a need to provide information to patients, 68 doctors (41.7%) indicated that they often experienced a need to provide information to patients, and 28 doctors (17.2%) indicated that they very often experienced a need to provide information to patients. If an aggregate is taken, 96 doctors (59.9% of N) are the ones who answered this question and they either often or very often experienced a need to provide information to patients.

e) Advising a colleague

Findings for question 20(e) are reported with N=164 doctors. The results show that 8 doctors (4.9%) indicated that they never needed information for advising a colleague, 41 doctors (25% of N) indicated that they seldom needed information for advising a colleague, 85 doctors (51.8% of N) indicated that they often needed information for advising a colleague and 30 doctors (18.3%) indicated that they very often needed information for advising colleagues. If an aggregate is taken, 115 doctors (70.1% of N) are the ones who answered this question and they either often or very often needed information for advising colleagues.

f) Other facets of clinical duties

Findings for question 20(f) which wanted to know if the doctors needed information for other facets of clinical duties are reported with N=159 doctors. None of the 173 doctors who returned the questions indicated that they needed information for other facets of the clinical duties.

## 6.7 CONCLUSION

This chapter presented the quantitative results. The results illustrate the major circumstances under which the information seeking of Malawian doctors takes place. The results show that

barriers to information seeking in Malawi are real and the major ones as observed from responses to question 16 are workload and lack of resources. The results further show that there are differences in the understanding of EBM by doctors in Malawi and as a result of this there are differences in the extent of EBM application. Chapter 7 presents the qualitative study findings.

## CHAPTER 7. QUALITATIVE STUDY RESULTS

### 7.1 INTRODUCTION

This chapter presents the qualitative data that was collected through the key informant interviews. The results are presented under main headings used in the interview schedule as illustrated in Appendix 2, namely; doctors and information needs, information seeking, information sources and preferences, information sharing (including information sharing channels in their hospitals), and finally evidence-based medicine (EBM) and an assessment of the doctors' understanding of EBM. The design of the interview schedule was aligned to the main themes of the research questions. Table 7.1 shows the relationship between the relevant study sub-questions and the key themes that were addressed in the interview schedule.

**Table 7.1 Outline of the research sub-question and specific question that generated the results from the key informant interviews**

<b>Research sub-questions</b>	<b>Qualitative results from the key themes addressed in the interview schedule</b>
1. Profile of doctors	
2. On definition of information needs	Responses on definition of information needs
3. Information seeking preferences	Responses on EBM as a policy that induces information seeking
4. Information searching skills	Responses on information seeking
5. Sources doctors consult	Responses on what they know about their searching skills
6. Information use and EBM	Responses on reasons for the preferred source
7. Understanding of information behaviour practices and EBM practices	Responses on information use and EBM
8. Information sharing channels	Responses on understanding of EBM

### 7.2 PARTICIPANT PROFILE

This qualitative data is coming from 20 doctors who served as key informants in the hospitals visited. They were identified through purposive non-probability sampling as people who were knowledgeable of the hospital contexts but they were also practising doctors. The interviewed doctors included 9 specialists, 6 registrars, 3 residents and 2 medical interns. The other profile details of the participants are given in Table 5.3 in chapter 5 and also in Appendix 4.

### 7.3 CONDUCTING KEY INFORMANT INTERVIEWS

The key informant interviews were conducted in four different ways. This included one on one interviews while recording the conversation with a voice recorder and with permission from the participant, one on one interviews while taking notes in cases where the participants did not give permission to record the interview, phone interviews and Skype phone interviews where it was not possible to meet the interviewees. The last two were options that were chosen by doctors who were busy at the time they were visited. All the participants indicated that they were busy and on average they indicated that they could spare only 15 minutes and that became the average time that the interview took. It should be indicated that it was only the Skype interview that took 25 minutes. The participant arranged for the Skype interview in the evening after work from his home. There was one participant who arranged that the interview be held at the hotel where he was attending a workshop. The rest of the participants were interviewed while they were at their place of work. Four participants were interviewed over the phone, one participant was interviewed over Skype call and the remaining ten participants were interviewed in person (See summary in table 7.2). All the notes written during the interviews or transcribed after the interviews were sent to the participants for verification and they were accepted. Each participating doctor was coded by being given a special number that corresponded to his or her identity and through this the study came with Doctor 1 up to Doctor 20. This ensured the anonymity of the participants.

**Table 7.2 The interviewing methods and the amount of time taken per person**

TYPE OF METHOD	NUMBER OF PARTICIPANTS	AMOUNT OF TIME TAKEN PER PARTICIPANT
1. Skype interview	1	25 minutes
2. Phone call	4	15 minutes
3. Interview in person	15	15 minutes

### 7.4 THEMATIC ANALYSIS OF RESPONSES

The verified interview notes from each doctor were then analysed using thematic analysis which is a common data analysis method in qualitative research. This involved reading through the data transcriptions and notes several times in order to identify from the doctor's responses that related to the five broad (overarching) themes on the interview schedule.

Using thematic analysis the following themes were identified:

- Doctors and information needs: under this theme, the focus was on which extra information the doctors need to help them make a clinical decision and what were the factors that caused them to look for information.
- Information seeking: under this theme the focus was on how doctors found information for clinical decisions and whether they faced any challenges in the course of doing that.
- Information sources: under this theme, the focus was on which information sources the doctors preferred and whether they faced any challenges that stood between them and their preferred information.
- Information sharing: under this theme, the focus was on the availability of information sharing channels.
- Evidence-based medicine: under this theme, the focus was on understanding of EBM, feelings about applying EBM, whether it could make any difference and their attitude to EBM.

Where applicable, sub-themes were also identified. Verbatim quotations are included in the write up as evidence to support and illustrate the findings further. The quotations are exactly as stated by the doctors with only minor editorial corrections.

## **7.5 DOCTORS AND INFORMATION NEEDS**

Key informants were asked about their information needs for enhancing their clinical decisions by using two prompting questions. The two questions were:

- Apart from your own knowledge and experience that you have with your job, which extra information do you need to help you make clinical decisions?
- What are the factors that cause you to look for extra information to help you with your clinical decisions?

Doctors were also asked to talk about the factors that cause them to realise that they have information needs. Through thematic analysis several sub-themes were identified. These are sub-divided between (i) specific information needs; and (ii) triggers of information needs.

### **7.5.1 Specific information needs**

The qualitative study results show that the responses of the doctors revealed specific information needs which are outlined from section 7.5.1.1 to section 7.5.1.12 below:

#### **7.5.1.1 Diagnostic uncertainties**

Uncertainty regarding diagnosis was one of the recurring themes, that is, ‘failure to diagnose the clinical problem or medical condition of the patient.’ Diagnostic uncertainties were reported by all 20 interviewed doctors. Responses from three doctors working in different environments and who are in different professional categories were selected to illustrate this observation or trigger for an information need. The first is a response from Doctor 4, a District Medical Officer from a rural government hospital who is in the Registrar’s category:

*There are three situations that cause me to realise I need information. The first is the situation where I come across a case that I am not able to do a diagnosis and I can’t just break through (Doctor 4 interviewed on 3<sup>rd</sup> October 2015).*

The second response is from Doctor 8, a Specialist Paediatrician from an urban private hospital who also serves as a Hospital Director:

*Firstly, if during diagnosis I come across something new, I have to read about it (Doctor 8 interviewed on 3<sup>rd</sup> October, 2015).*

The third response is from Doctor 19, a Medical Intern working at a busy urban government referral hospital who reports that she handles challenges with diagnosis as follows:

*When I come across patient problems that I cannot diagnose, I try on my own to look for information by using Google on my phone and when I fail to breakthrough I consult my registrar or my consultant (Doctor 19 interviewed on 31<sup>st</sup> October, 2015).*

#### **7.5.1.2 Uncertainties about treatment and management of a disease**

Responses also revealed uncertainties about treatment, which is, ‘not being sure about the treatment’. All 20 interviewed doctors reported uncertainties about treatment. In essence there are three scenarios that cause doctors to realise that they need information on account of the treatment they seek to give to the patients. The first one is when they don’t know from the onset of the diagnosis what treatment to give. The second is when the patient’s condition does not improve on account of an earlier treatment they gave and there are no side effects. The third scenario is when the previous treatment given to a patient produces negative side effects. Responses from Doctor 4, Doctor 8 and Doctor 10 below allude to the existence of



these three different scenarios for recognising an information need for treatment among doctors in Malawi:

*A second situation is where I am able to do a diagnosis alright, but I am not sure about what the best treatment should be. A third situation is where I am sure about the diagnosis and the treatment but then I need to know more about the management of the disease (Doctor 4, interviewed on 3<sup>rd</sup> October 2015).*

*Secondly, the desire to give the best care and treatment to the patient causes me to weigh different alternative treatment options and I cannot do this without looking for information, reading it and understanding it (Doctor 8 interviewed on 3<sup>rd</sup> October 2015).*

*Sometimes I want to know more about the kind of treatment that I have to give and so I need to read the latest on that kind of treatment. When we were students we were told that this medicine cures this disease and that one but some of the diseases are becoming drug resistant. Some drugs just come in without any study that would relate to the kind of side effects that they would have and so one has to read more about them. I am always cautious as a doctor of the kind of side effects that some of these drugs can cause (Doctor 10, interviewed on 3<sup>rd</sup> October 2015).*

### **7.5.1.3 Patient care**

The need for quality of patient care is salient from the responses of the doctors. This is especially important after the diagnosis is done and the treatment is given. The response below from a District Medical Officer from a rural government hospital demonstrates well the doctors' needs for information to manage patients:

*I indicated earlier on that I am working in resource limited environment and I need to elaborate on what I mean by that. I would say that the limit is not necessarily on the information as such but rather I am limited in the area of investigation. The disease patterns are not the same as was the case when I was a medical student six years ago. In the questions that I ask the patients, I do not go beyond the first three stages [in the five stage questioning model for doctors] because I have little time. I would love to ask more questions to the patients but there are so many patients that I have to see and I don't have the time to explore more into the causes of the diseases so that I can manage and care for the patient better (Doctor 12, interviewed on 20<sup>th</sup> October, 2015).*

#### **7.5.1.4 Need for self-efficacy in dynamic medical science environments**

Williams and Rhodes (2016) define self-efficacy as ‘an individual’s belief in his or her capacity to organise and execute the courses of action required for specific performance attainments.’ The ‘need for self-efficacy’ in the face of an ever evolving medical science environment was another theme coming from the responses of the doctors. The interviewed doctors acknowledged that medicine is an ever changing subject and that if they have to be effective, they have to stay up-to-date all the time, or they need to acknowledge when their skills and knowledge are insufficient and when their self-efficacy is low:

*As we do diagnosis sometimes we come across some diseases that are out of the ordinary, completely new things and we have to look for extra information (Doctor 2, interviewed on 1<sup>st</sup> October, 2015).*

The quest for self-efficacy, the study found out, also causes doctors in Malawi to drive a long distance away from the hospital at own cost just to look for credible sources of information from the Internet.

*I drive for 15 kilometres into town to some Internet Café to look for these pieces of information. Sometimes I search for information on the Internet using my smart phone and I use it to download eBooks whenever I come across them (Doctor 6, a Chief Medical Officer, interviewed on 3<sup>rd</sup> October, 2015).*

- The need for self-efficacy is also demonstrated through the way Doctor 14 is motivated by her belief in her capability to devise alternative medical procedures in the midst of lack of information and the audacity to look for information to support those alternative procedures.

*I have to look for information that must inform us about the pros and cons of whatever improvisation we want to engage in. You see when we have no material resources for certain procedures, we still have to move on because patients keep on coming to us day in day out and we can't just ignore them (Doctor 14, interviewed on 20th October, 2015).*

#### **7.5.1.5 Pressure to stay abreast of new developments**

This study found that there were two groups of doctors in Malawi that were specifically conscious about the way they define their information needs and the need to keep themselves updated with new pieces of information in their field and these were the interns and the residents. The need for these two groups to demonstrate such consciousness in defining their

information needs in terms of staying up-to-date arises from the fact that they are appraised all the time by their supervisors. Interns get appraised at the end of eighteen months after which it is determined whether they should be admitted to medical practice or not. Residents are postgraduate students who are specialising in a particular area within the medical field. Two responses are singled out below to illustrate this point, and they are from Doctor 14, a resident in obstetrics and gynaecology and Doctor 2, a director in clinical services. The responses were as follows:

*As a resident, the expectations by the authorities over me are very high and so for academic reasons, we the students are forced to apply the best care in whatever we do. Then it becomes inherent in us that we should do that all the time (Doctor 14 interviewed on 20<sup>th</sup> October 2015).*

*Medicine is an evolving Science and you cannot obviously know 100% of everything as a doctor. There is bound to be something new that may come your way and you have to read more about it. For example if there is something new and you need to know more about it, may be a drug that you never learnt about at school, you may have to look for extra information. As we do diagnosis sometimes we come across some diseases that are out of the ordinary, completely new things and we have to look for extra information (Doctor 2, interviewed on 1<sup>st</sup> October, 2015).*

#### **7.5.1.6 As a reaction to patient action or lack of action**

The need to crosscheck and verify information from patients also stood out as a theme from the responses of the doctors. The implication here is that some patients do their own research on their medical condition and they present the information they find to the doctor attending to them. The doctor may not be conversant with what is being presented hence the need to crosscheck by looking for more information on the patient's condition. The other scenario is where the patient is asking the doctor questions about his or her condition and the doctor does not have a ready answer. Doctor 16, a specialist surgeon from an urban government hospital explains how such scenarios bring special information needs:

*Sometimes I deal with patients who are enlightened and are very inquisitive about their medical condition and anything that I am doing about it. These are people who ask you questions and you have to give them answers as a specialist. Sometimes the questions that they ask are too technical or too detailed. At that point, I tell them that I will come back to them later. Meanwhile I go and read about the things that I was asked about*

*just to make sure that the answers that I give are precise (Doctor 16 interviewed on 28<sup>th</sup> October 2015).*

The thematic analysis of the responses by the doctors also showed that there is another side of the response about a patient's influence on the information needs of the doctors. The non-engaging and passive behaviour of a patient can make doctors to be less active in terms of recognising information needs. Doctor 14, a resident in obstetrics and gynaecology at an urban government hospital provided another example in this regard. The key argument in her response is that if a doctor is interacting with very active patients in terms of asking questions or presenting their enlightened versions of their own sicknesses i.e. what they searched on their own from credible sources, the doctors are bound to be more active in recognising and defining their information needs and information seeking than when interacting with passive patients. This is well illustrated in the account of Doctor 14 below:

*I mostly deal with the rural based women most of who are illiterate and they don't normally ask you, as a doctor, questions about their conditions and the like. This is why I am saying from this angle they don't motivate or excite me to look for extra information beyond looking for general or routine information for diagnosis and treatment. Most of these patients are not tasking and engaging. That is what makes the difference between dealing with an enlightened patient and one that is passive and is not enlightened (Doctor14, interviewed on 20<sup>th</sup> October 2015).*

#### **7.5.1.7 Need to communicate with patients in simple language**

The need to look for information that would 'simplify the language that is too hard to understand' also emerged as a theme from Doctor 8, an expatriate, who comes from a developing country that is outside Africa and whose first language is not English. The question of language for this expatriate is twofold: Firstly, she does not speak the local Malawian languages and she therefore has to talk to her patients who don't speak English through a nurse as an interpreter. Secondly, where she encounters English words or medical terminologies that she cannot understand, she has to look for information sources that give simplified explanations of these terminologies. In her own words:

*I see the need for information when I come across something that is in a language that I do not understand (Doctor 8, interviewed on 3<sup>rd</sup> October 2015).*

#### **7.5.1.8 Information on legally and ethically correct conduct**

The desire to be legally and ethically correct also often featured in responses. This is closely related to the desire to operate within the ethical framework of their parent institutions. The

response from Doctor 1 is particularly interesting in this regard. He is an expatriate from an African country working in Malawi and by the time of the interview (2015), he had been in Malawi for only one year. He was apparently the sole doctor at a Christian hospital and in that regard he had to acquaint himself with the moral ethics of the church that ran that hospital on such things as abortion and contraceptives. Besides this, he also had to acquaint himself with the Laws of Malawi on abortion. Such circumstances lead to information needs as Doctor 1 explains below:

*In my case I am working in a CHAM hospital that belongs to a church and there are many things that motivate me to define my information needs. Sometimes I meet a patient with a complicated obstetric problem that needs surgery that involves abortion. Sometimes I am sure the patient needs abortion but I have to look for information on what the Medical Council of Malawi and the Laws of Malawi say about abortion. I have to also look at what the church's ideology says about the same. I therefore go an extra mile to look at what the church's ideology says. As an example, sometimes you come across a patient who has had many pregnancies and you know she needs a Tubal Ligation (TL). At first I was not informed about these things therefore I had to consult friends from the other hospitals (Doctor 1, interviewed on 20<sup>th</sup> September, 2015).*

#### **7.5.1.9 Need for timely information on pandemics and dealing with disasters**

The responses of the doctors also showed that they needed to be prepared in the face of looming pandemics or disasters. Preparation in this regard refers to gaining knowledge that would help reduce the risk of the pandemic on both the health workers and the general populace. It is not surprising that this theme emerged from the response of Doctor 5, a Hospital Director at one of the biggest referral hospitals in Malawi as illustrated below:

*There are so many circumstances at this hospital that cause clinicians to define their information needs or to realise that they need information. I would for example, cite the emergency of new diseases like Ebola. When Ebola came on the scene last year (2014) in West Africa, there was pandemonium, anxiety and a bit of fear over here in Southern Africa and specifically here in Malawi although we have had no known Ebola cases. Ebola put pressure on us to define more than ever our information needs about all the aspects of this strange and deadly disease. This is because we saw on TV and read in electronic and print media how even doctors were being infected by the very disease they were trying to cure and we saw how even some died from it. We therefore wanted to be well informed just in case there was an outbreak here in Malawi. Therefore we*

*had to read as much as we could and made sure that all hospital members of staff were informed about Ebola (Doctor 5, interviewed on 3rd October, 2015).*

#### **7.5.1.10 Need for information on appropriate improvisation**

The need to look for information that can help doctors improvise in the midst of a lack of resources was visible as a theme from the responses. This was presented as a situation where doctors' knowledge of the resources they need for certain clinical procedures is good but they have to improvise due to lack of resources due to poor budgets. However, before improvising they have to look for information that would help them to understand the pros and cons of the improvisation they want to do. This theme is evident in the response from Doctor 14, a resident obstetrics and gynaecologist from an urban government hospital. Her response goes as follows:

*I have already indicated that we are working in a resource poor environment and all the time one has to improvise because of lack of resources and this is a very big challenge. It becomes a very big challenge because while improvising I come up with information needs that must help me to do that. I have to look for information that must inform us about the pros and cons of whatever improvisation we want to engage in. You see when we have no material resources for certain procedures, we still have to move on because patients keep on coming to us day in day out and we can't just ignore them (Doctor 14, interviewed on 20<sup>th</sup> October, 2015).*

#### **7.5.1.11 Need for information on teaching, learning and professional development**

'The need for teaching, learning and professional development', also emerged from responses. This theme specifically came from doctors who are teaching at the College of Medicine while practising at the government hospital. Three extracts from narratives are presented below:

*I have to prepare for my students in Ophthalmology and that means I have to look for information which I can read before the class (Doctor 11, specialist in ophthalmology interviewed on 20<sup>th</sup> October, 2015).*

*I need to prepare for my classes and I need to be ahead of my students in understanding my subject area. Apart from the teaching, I need to professionally develop and in that regard I need updates on new things in my area (Doctor 17, interviewed on 28th October, 2015).*

*I need to add that as a resident I am expected by supervisors to be on top of the game, thus I need information as part of the learning process for my specialist masters in medicine degree (Doctor 14, interviewed on 20th October, 2015).*

From the sub-themes it is clear that doctors define their information needs in terms of their responsibilities, care of patients and making choices. The categorisation of sub-themes on the recognition and defining of information needs is given in Table 7.3.

**Table 7.3 Categorisation of sub-themes and the defining of information needs**

<b>Defines information needs in terms of...</b>	<b>Sub-themes</b>
Uncertainties	Diagnostic uncertainties
	Disease treatment and management
	Unfamiliar situations e.g. pandemics, disasters
	Improvisation
Roles and responsibilities	Patient care
	Teaching, learning, and professional development
	Clinical decision-making e.g. between choices
Meeting with expectations	Staying abreast
	Ensuring high levels of self-efficacy
	Ensuring legally and ethically correct conduct
Communication with patients	Simplifying language of discussion and explanation
	Reaction to patient actions (or lack of action) e.g. sourcing information from other sources

#### **7.5.1.12 Need for information supporting decision-making between choices**

The responses of the doctors also revealed the need to look for information that helps them to make a choice between two options. It should be emphasised here that this need for information is different from the need for information in order to improvise as expressed by Doctor 14 in section 7.5.2.3 in the sense that here the doctors have to make a choice between two seemingly good options while improvising goes for the second or third best option because the best is not available due to lack of resources in that particular hospital. The need to choose between two options was presented by a specialist surgeon who works at a government hospital besides teaching at the College of Medicine and it is presented below:

*As I handle a patient, I may have two or more treatment options. This causes me to look for information that can help me assess and weigh the best evidence; especially choices that will best work in our environment with limited resources (Doctor 16, interviewed on 28<sup>th</sup> October, 2015).*

### **7.5.2 Triggers of information needs**

The study found that there are several triggers of information needs which are outlined from section 7.5.2.1 to section 7.5.2.4 in the paragraphs below.

#### **7.5.2.1 Patient information and questions as triggers of information needs**

Doctors interact with patients and ask questions in order to source primary information from patients e.g. on their medical history, symptoms, etc. The claim by Doctor 12 below that she wished she could ask more questions to the patients but she fails to do that because of time is in itself proof that the doctors in Malawi ask questions in order to source primary information:

*In the questions that I ask the patients, I do not go beyond the first three stages [in the five stage questioning model for doctors] because I have little time. I would love to ask more questions to the patients but there are so many patients that I have to see and I don't have the time to explore more into the causes of the diseases (Doctor 12, interviewed on 20<sup>th</sup> October, 2015).*

The above point is further substantiated by the claim by Doctor 16 who indicates that he looks for information in order to respond to the questions asked by enlightened patients during consultation. This connotes a two-way conversation during consultation:

*Sometimes I deal with patients who are enlightened and are very inquisitive about their medical condition and anything that I am doing about it. These are people who ask you questions and you have to give them answers as a specialist. Sometimes the questions that they ask are too technical or too detailed. At that point, I tell them that I will come back to them later (Doctor 16 interviewed on 28<sup>th</sup> October 2015).*

Doctor 14 in the quotation below further demonstrates the need for doctors to get questions from patients as she expresses her preference for patients who are more engaging during consultations. She argues that patients who ask questions motivate her. Doctor 14 indicated this need as follows:

*I mostly deal with the rural based women most of who are illiterate and they don't normally ask you as doctor questions about their conditions and the like. This is why I*



*am saying from this angle they don't motivate or excite me to look for extra information beyond looking for general or routine information for diagnosis and treatment (Doctor 14, interviewed on 20<sup>th</sup> October, 2015).*

#### **7.5.2.2 Referral notes as triggers of information needs**

Referral notes from other doctors, with information on the condition of a patient can trigger information needs e.g. a need to get more information from the referring doctor on cases at hand. Doctor 3 who is a Director of Clinical Services from one of the four central hospitals in Malawi pointed out how their hospital uses meetings to source more information; this includes information on referred cases.

*Meetings are the biggest information sharing channels at our hospital. We do have morning meetings, audits, grand orientations, departmental meetings and referral meetings where among other things we study the cases that have been brought at our hospital together with their referral notes (Doctor 3, interviewed on 2<sup>nd</sup> October, 2015).*

Normally, the referral cases are referred to specific specialists in the field and the need to have the referral cases and their notes submitted to seniors or to a referral meeting, imply further information sourcing from colleagues (human sources of information).

#### **7.5.2.3 Difficulty to access information as a trigger of information needs**

The responses from the doctors revealed that when some of them face challenges in finding information in one way (i.e. difficulty in access), they then turn to other methods of looking for information. Doctor 14 explained:

*There are quite a few challenges that I face. There are also problems of accessibility and availability of information. Currently I would say that things look easy for us because we are students and we have all the scholarship support for the information that we want and we are expected to read and prepare for our classes. The reality however is that the hospitals are not supported and it is difficult for us to get the kind of support that we get in classes. We do feel the difference. The other challenge is that the hospitals have no computers and when one or two computers may be found there is no working Internet and we have to depend on the Internet on our phones using our own money. If I am using the Internet on my phone, there is a limit to the number of databases that I can access. I only use Google, Pubmed and Wikipedia (Doctor 14, interviewed on 20<sup>th</sup> October, 2015).*

Doctor 14 is a resident (a consultant in training) and she compares the experience that she goes through while in class that is well supported with information sources with the experience when she is alone in the ward. When in the wards, she needs to turn to alternative sources for information. This is important since a lack of information resources can also impact on the quality of care she offers. Looking for alternative information resources is part of improvisation and in the course of that new needs for information might also arise. She explained as follows:

*There are also those moments when I want to understand more about the physical management of a patient and this has nothing to do with treatment or diagnosis. My environment is a low resource environment and so every time I have to look for information on how I can improvise for some situations before me (Doctor 14, interviewed on 20 October, 2015).*

#### **7.5.2.4 Influences from the micro and macro environment as trigger of information needs**

The responses of the key informant doctors demonstrated that there are two ways to look at the factors governing the environments in which they work (i.e. the micro environmental factors i.e. the local hospital level and the macro environmental factors i.e. the national level). These micro and macro environmental factors become barriers to the information behaviour practices of doctors and they may force doctors to improvise solutions in the midst of lack of resources. Thus the context of information needs is important since it can have a positive or negative influence on how information needs are experienced, as well as the specific information needs. The argument is that the micro challenges in the local working environments of doctors are a trickle-down-effect in effect from the macro challenges at the national level. For example, the poor health budget at the national level (i.e. the macro level) results in poor information infrastructure backbone of the hospitals, lack of computers, poor or no library, and poor Internet bandwidth. Doctor 6 in his response on the challenges that he was facing explained:

*I would sum up the main challenges of the hospital as lack of...financial resources. I had to drive to town to an Internet cafe to look for information that should aid me to understand some cases and I always use my own money for the transport and for paying the Internet cafe. We don't have access to books apart from the guidelines and protocols that we receive from the government. There is no budget for information resources at the moment. In the past, like I said, the hospital used to pay for the*

*Internet access but now that is not done. The new administrator thinks that is not a priority in the face of the austerity budget (Doctor 6, interviewed on 1<sup>st</sup> October, 2015).*

The doctors also reported very poor health budgets at the local hospital level. The hospital budgets are generally below the expectations of the World Health Organisation's (2017) Abuja declaration as described in section 2.4 of this study. The responses of Doctor 2, a Director of Clinical Services and Doctor 14 a resident in obstetrics and gynaecology, who works at the same urban government hospital as Doctor 14, underpinned the budgetary challenges in addressing information needs arising from the macro context to the micro context (i.e. their institution):

*As a hospital we do not have adequate funds for developing our local information resources and EBM needs. As a department we may make our budget submissions but realistically these do not work because every year there is a budget cut. Just imagine, 10 years ago this hospital used to receive a budgetary allocation of MK70 million when the exchange rate between the United States of American (USA) Dollar (US\$) to the Malawi Kwacha (MK) was US\$1 to MK160. You can imagine how many dollars it was! Well over US\$400,000. Now come to think of this; the budget that we have received this year (2015/2016 Financial Year) is MK50 million and the current exchange rate between the US dollar and the Malawi Kwacha (MK) is now almost US\$1 to MK600 which means we received a total budget of about \$80,000 and we cannot do much with that. If you look at our current budget, it is 5 times less than what we used to receive 10 years ago. Like this, I think we are not progressing, we are actually retrogressing. Such a small amount of money cannot allow us to undertake the activities that we want and let alone create a good information infrastructure and resources that could assist us to define our information needs (Doctor 2, interviewed on 1<sup>st</sup> October, 2015).*

*Currently I would say that things look easy for us because we are students and we have all the scholarship support for our information needs as Masters in Medicine students. The scholarship support is there to help us read and prepare for our classes. The reality however is that the hospitals are not supported financially and it is difficult for us to get from the wards the same kind of support that we get in classes. We do feel the difference. Our colleagues who are not on scholarship do not have such benefits. The other challenge is that the hospitals have no computers and when one or two computers may be found there is no working Internet and we have to depend on the Internet on our phones or tablets using our own money. If I am using the Internet on my phone, there*

*is a limit to the number of databases that I can access for my information needs. I only use Google, Pubmed and Wikipedia (Doctor 14, interviewed on 20<sup>th</sup> October 2015).*

The net effect of the budgetary challenges that are expressed by Doctors 6, 2 and 14 above cause many doctors to push themselves and to think outside the box in terms of how they can address their information needs.

#### **7.5.2.5 Information needs triggered by the implied impetus to practice EBM**

The doctors' responses to the interview schedule exposed the implied impetus from the need to practice EBM as a trigger of information needs. This is well depicted by the conversation with Doctor 14 during the key informant interview:

***Is EBM part of the policy at your hospital?***

*“Yes it is. O & G<sup>14</sup> insists on this.”*

***What is your understanding of the evidence based medicine?***

*“It is the application of current and recognised evidence and practice for the best medical practices and care of our patients.”*

***Are you influenced by evidence based medicine in your quest for information?***

*“Yes I am because as a resident, the expectations by the authorities on me are very high and so for academic reasons, we the students are forced to apply the best care in whatever we do. Then it becomes inherent in us that we should do that all the time.”*  
*(Doctor 14, interviewed on 20<sup>th</sup> October, 2017)*

This study acknowledges that there might be further sub-themes for each of the sub-themes discussed for information *per se*, as well as for triggers of information needs that can imply specific information needs.

Although responses revealed information needs, triggers of information needs, and circumstances that make doctors aware that they need information (i.e. the recognition of information needs), responses did not show how doctors define and articulate information needs in terms of actually seeking information e.g. searching a database.

## **7.6 INFORMATION SEEKING**

Two questions collected data on information seeking. The first one was, ‘How do you normally look for extra information apart from your clinical experience?’ The second

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<sup>14</sup> O & G is an abbreviation for Obstetrics and Gynaecology.

question was, “Is it easy for you or are there some challenges or barriers?” The responses to these questions revealed broad themes that were identified:

- Means of information seeking
- Challenges to information seeking

### **7.6.1 Means of information seeking**

A number of themes emerged from an analysis of the responses of the key informant interviews of the doctors on what means they used for information seeking. A list of the means of information seeking is presented below with selected citations of the doctors who identified a particular means of information seeking; the full quotes of the doctors’ responses appear below the list:

- Reaching out to colleagues who are experts in the areas that challenge them (Doctor 12).
- Searching the Internet (Doctor 6).
- Using information sources such as textbooks and printed journals (Doctor 16).
- Accessing the social web (Doctor 12).
- Asking patients questions (Doctor 12).
- Downloading and using eBooks (Doctor 6).
- Using materials available from the Ministry of Health (Doctor 6).
- Using donations of books (Doctor 16).

Doctor 12 explained:

*I am working in a resources limited hospital and I am always interested in seeking into the information history of the cases that I am handling. However when I am challenged and I have to seek for information, I ask colleagues who are either specialists or are doing an in-depth specialist study of my problem areas. I have kept a network of friends through the social web who are doctors that are currently specialising or are already specialists in particular medical fields such as internal medicine, obstetrics, etc. Many of these friends of mine are working in the major central (referral) hospitals of the country. Apart from these friends, I also rely on Internet searches. I use MEDSCAPE which is a [reliable] Web resource for physicians and health professionals. It is a good*

*resource and it gives me the latest information about disease conditions, medical news for the world of the doctors, drugs and their side effects, background causes of diseases, prognosis, etc. I need to point out though that although this resource is generally very good, most of the medical or clinical cases that it relates to are from the American or Western context that do not relate on a one to one correlation with the tropical diseases and infections that I encounter in the Malawian context. Despite this, I still find it to be very helpful. I started using MEDSCAPE when I was a student and I trust it. I indicated earlier on that I am working in resource limited environment and I need to elaborate on what I meant by that. I would say that the limit is not necessarily on the information as such but rather I am limited in the area of investigation. The disease patterns are not the same as was the case when I was a medical student 6 years ago... We also do have books in our offices such as guidelines for special programmes and the few other medical books we have are very out-dated. We do have a room quite all right that was earmarked as a library but it was turned into a store room because there is no librarian and in any case we don't have any books and related library stock (Doctor 12, interviewed on 20<sup>th</sup> October, 2015).*

Doctor 6 (a chief medical officer) stressed the use of personal resources in order to seek clinical information. This was in response to two questions; Firstly, how do you normally look for extra information? Secondly, is it easy for you or are there some challenges? The response of Doctor 6 demonstrated the commitment and drive of some doctors and the personal effort they are prepared to make as shown below:

*When I know I want information I contact consultants who are specialists in the problem areas facing me. I contact them through my mobile phone most of the time. Apart from that I seek the information I need on the Internet. I search using PubMed and HINARI. I am fortunate because I learnt how to use these when I was a Master of Public Health student at College of Medicine of the University of Malawi just a few years ago. I drive for 15 kilometres into town to some Internet Café to look for these pieces of information. Sometimes I search for information on the Internet using my smart phone and I use it to download eBooks whenever I come across them. I need to mention here that we also receive materials from the Ministry of Health that inform us about the protocols for treatment and I use these as well to inform myself and keep up with standards. As for our library, there are a lot of challenges with it. I have been around for 10 years but the books that are in the lockable shelves have never really been accessed because the one who used to be the library attendant died 10 years ago*

*and no one knows where he kept the keys for these lockable shelves. As a result of this, the library books are not used and by now they are very much out-dated. The hospital has never acquired any books from its budget. I understand the few books that we have got came as donations some time back (Doctor 6, interviewed on 22<sup>nd</sup> September 2015).*

Doctor 16 quoted below indicated how he uses books as sources of information:

*I depend more on text books. In surgery we do have standard books that are the standard reference. You might wish to know that surgical information changes very slowly. A surgical book when published can still be valid for the next 5 years (Doctor 16, interviewed on 28<sup>th</sup> October, 2015).*

### **7.6.2 Challenges to information seeking**

Several sub-themes on challenges to information seeking were identified from the responses of the doctors that are quoted after the list of themes, namely:

- workload and overworking (Doctor 1)
- lack of time (Doctor1)
- very slow Internet or no Internet access at all (Doctor 17)
- lack of search skills (Doctor 7)
- westernised content (Doctor 12)
- resource poor environments (Doctor 14)
- lack of library services or having a library room and books which have been locked away (Doctor 6 and Doctor 12)
- long distance to Internet cafes (Doctor 6)
- out-dated books (Doctor 6)
- poor budgets (Doctor 2)

The following paragraphs report the verbatim quotations from the doctors supporting the list of challenges. These are presented in the order of the list as follows:

*I have been working at this hospital for about one year now and I am the only doctor in the entire hospital. I therefore work as a clinician, a teacher and the administrator and I have to attend the management meetings and workshops and it is not easy. The*

*workload for me is just too big...There are many challenges that I face in the hospital. I would sum up these as lack of resources, heavy workload and lack of time (Doctor 1, interviewed on 20<sup>th</sup> September, 2017).*

*Even the Internet which we have is not very reliable because it may work one day but not the other. As you want to look for information, you find the Internet is not there [is not working] (Doctor 2, interviewed on 1<sup>st</sup> October, 2017).*

*I need to be honest here, right from the college days I have never been keen on using the medical databases and besides this we do not have access to the Internet at this hospital. That is the challenge that I have (Doctor 7 interviewed on 22 September, 2015).*

*I need to point out though that although this resource is generally very good, most of the medical or clinical cases that it relates to are from the American or Western context that do not relate on a one to one correlation with the tropical diseases and infections that I encounter in the Malawian context (Doctor 12, interviewed on 20<sup>th</sup> October, 2015).*

*I have already indicated that we are working in a resource poor environment and all the time one has to improvise because of lack of resources and this is a very big challenge (Doctor 14, interviewed on 20<sup>th</sup> October, 2015).*

*I would therefore say that the major challenges of information sourcing for doctors are; poor electronic resources and lack of library services (Doctor 2, interviewed on 1<sup>st</sup> October, 2015).*

*I have been around for 10 years but the books that are in the lockable shelves have never really been accessed because the one who used to be the library attendant died 10 years ago and no one knows where he kept the keys for these lockable shelves (Doctor 6, interviewed on 22<sup>nd</sup> September, 2015).*

*I had to drive to town to an Internet cafe to look for information that should aid me to understand some cases and I always use my own money for the transport and for paying the Internet café (Doctor 16, interviewed on 22<sup>nd</sup> September 2015).*

*I trust the human sources that I consult but as for the books that I use, I would say they are out-dated. The hospital does not buy books for us and like you saw our library is*



*not functioning. That is the challenge that I have (Doctor 7, interviewed on 22<sup>nd</sup> September, 2015).*

*The biggest challenges at our hospital is that we receive very little funding from the government. I can tell you that for any budget that we make, we receive only 15% of what we propose in the budget. This means that we are currently only achieving 15% of the things that we would like to do. We are barely running the services of the hospital on curative basis and not on preventive basis. Imagine there are 200-300 in-patients at our health centre every day and we need to give them the best of care but we can't if we are financially handicapped (Doctor 12, interviewed on 20<sup>th</sup> October, 2015).*

## **7.7 PREFERENCES FOR INFORMATION SOURCES**

This section presents the results on the reasons that the interviewed doctors indicated that they used or preferred some sources to others, as well as the specific challenges faced in Malawi regarding some information sources. Thus the following themes came out:

- Sources used
- Sources preferred
- Reasons for preferences of information sources
- Challenges experienced in Malawi

### **7.7.1 The types of sources used**

The interviewed doctors indicated that they used the sources listed below:

- Human sources (Doctor 7)
- Social web (Doctor 12)
- Electronic databases such as HINARI (Doctor 6)
- Open access medical databases such MEDSCAPE (Doctor 12)
- Textbooks (Doctor 16)

### **7.7.2 Reasons for preferences of information sources**

From data on the doctors' reasons for preferring information sources, the following stood out as reasons:

- Trust in information sources (Doctor 7)

- Perceptions of slow change of information in fields like surgery (Doctor 16)
- Need for cutting edge information (Doctor 16)
- Knowledge on the expertise of a person (Doctor 7 and Doctor 12)
- Lack of skills to use alternative sources such as medical databases (Doctor 7)
- Lack of access to Internet (Doctor 7)
- Habits (Doctor 7 and Doctor 12)
- Absence of a good library with books and journals
- Appropriate skills in using an information source (Doctor 12)
- Willingness to use personal resources and initiative (Doctor 6 and Doctor 12)

These reasons were echoed by many doctors in different settings and different professional positions. The responses quoted from Doctors 16, 7 and 6, explain most (although not all of these) reasons.

Doctor 16, a specialist surgeon working in an urban government hospital, explained his trust in medical textbooks:

*I have three or four traditional sources of information that I consult. I depend more on text books. In surgery we do have standard books that are the standard reference. You might wish to know that surgical information changes very slowly. A surgical book when published can still be valid for the next 5 years. I receive a lot of surgery books from my professional networks and I donate a lot of books to friends. We have actually a good surgical library in our department. I also look for information in journals. I am interested in journals with cutting edge research on rare issues. The databases that I use most are things like HINARI and PubMed (Doctor 16, interviewed on 28<sup>th</sup> October 2015).*

Doctor 7, a medical officer (registrar) in a rural CHAM hospital, expressed his preference for people as information sources:

*I trust the human sources that I consult because they are people I personally know as authorities in their subjects of specialisation but as for the books that I use, I would say they are a bit out-dated and I don't rely on them. The hospital does not buy books for us*

*and like you saw, our library is not functioning. I am also not that good when it comes to using the E-journals and medical databases. I need to be honest here, right from the college days I have never been keen on using the medical databases and besides this we do not have access to the Internet at this hospital. That is the challenge that I have (Doctor 7 interviewed on 22 September, 2015).*

Doctor 6, a chief medical officer (registrar) in a rural CHAM hospital explains why he is more comfortable with the medical databases such as PubMed and HINARI. What is more interesting is that he comes from the same hospital as Doctor 7 above and yet he (Doctor 6) is keen on overcoming his challenges by using personal resources. Doctor 6 demonstrates the will to use personal resources and initiative in a hospital with limited information resources and his response is narrated as follows:

*I search using PubMed and HINARI. I am fortunate because I learnt how to use these when I was a Master of Public Health student at (University of Malawi) College of Medicine just a few years ago. I drive into town to some Internet Café to look for these pieces of information. Sometimes I search for Information on the Internet using my smart phone and I use it to download e-books whenever I come across them. By the way, I use my own money when I search the Internet using my phone (Doctor 6 interviewed on 22<sup>nd</sup> September, 2015).*

Doctor 12 in the quotation below explains how she uses the social web and the reason why:

*I have kept a network of friends through the social web who are doctors that are currently specialising or are already specialists in particular medical fields such as internal medicine, obstetrics, etc. (Doctor 12 interviewed on 20<sup>th</sup> October 2015).*

The reasons given by the doctors also reflected a positive attitude that they had towards their job and the kind of motivation that they had. These reasons are captured in Table 7.4 below:

**Table 7.4 Reasons for preferences and examples of preferred source related to the reasons**

<b>REASONS FOR PREFERENCES</b>	<b>EXAMPLES OF PREFERRED SOURCES</b>
Trust	Textbooks on surgery
Perceptions of slow change of information in fields like surgery	Standard textbooks on surgery
Need for cutting edge information	Professional journals
Physical accessibility	Specialists close by or through phone Google through smart phone
Financially supported through project	South African specialists through links with MSF
Donations	Surgery books and emergency medicine books
Teaching resources	College of Medicine Library

### **7.7.3 Information sources and Malawi specific challenges**

Environmental factors can have a positive or negative effect, as also explained in chapter 2 which sets the context for Malawi, where the impact of the environment on macro and micro level were explained. For purposes of this study, Malawi as the macro level environment or context is especially important. Sub-themes that were identified from responses include:

- Macro level challenges: Poor health budgets as the macro cause of all challenges (Doctor 2)
- Micro level challenges: All the other challenges highlighted by the doctors in section 7.6.2 such as, poor budgets which bring lack of resources such as computers and the Internet with good bandwidth.

The observation by Doctor 2 below is that the problems at macro level will affect what happens at micro level. For example, the responses about lack of computers or poor Internet bandwidth from the doctors showed the effect of macro level challenges on micro level or local contexts such as the individual hospitals which were said to have old and inefficient computers with very poor bandwidth. The poor health budgets at macro level and their effect on the micro level are another example. The interviewed doctors also narrated very poor health budgets at a local hospital level. These poor local hospital budgets mirror the poor national health budget which has been below the expectations of the World Health

Organisation's (2017) Abuja declaration as described in section 2.4 of this study. The poor budgets cannot support the information and material resources required at the local context. The responses of the doctors decry the lack of support for resources for their information needs. The responses of Doctors 2, a Director of Clinical Services and 14 an Obstetrics and Gynaecology Resident who work at the same urban government hospital below underpin the challenges in addressing information needs arising from the micro or local context of their operation:

*As a hospital we do not have adequate funds for developing our local information resources and EBM needs. As a department we may make our budget submissions but realistically these do not work because every year there is a budget cut. Just imagine, 10 years ago this hospital used to receive a budgetary allocation of MK70 million when the exchange rate between the United States of American (USA) Dollar (US\$) to the Malawi Kwacha (MK) was US\$1 to MK160. You can imagine how many dollars it was! Well over US\$400,000. Now come to think of this; the budget that we have received this year (2015/2016 Financial Year) is MK50 million and the current exchange rate between the US dollar and the Malawi Kwacha (MK) is now almost US\$1 to MK600 which means we received a total budget of about \$80,000 and we cannot do much with that. If you look at our current budget, it is 5 times less than what we used to receive 10 years ago. Like this, I think we are not progressing, we are actually retrogressing. Such a small amount of money cannot allow us to undertake the activities that we want and let alone create a good information infrastructure and resources that could assist us to define our information needs (Doctor 2, interviewed on 1<sup>st</sup> October, 2015).*

*Currently I would say that things look easy for us because we are students and we have all the scholarship support for our information needs as Masters in Medicine students. The scholarship support is there to help us read and prepare for our classes. The reality however is that the hospitals are not supported financially and it is difficult for us to get from the wards the same kind of support that we get in classes. We do feel the difference. Our colleagues who are not on scholarship do not have such benefits. The other challenge is that the hospitals have no computers and when one or two computers may be found there is no working Internet and we have to depend on the Internet on our phones or tablets using our own money. If I am using the Internet on my phone, there is a limit to the number of databases that I can access for my information needs. I only use Google, Pubmed and Wikipedia (Doctor 14, interviewed on 20<sup>th</sup> October 2015).*

The two responses above show that despite how the national context influences the local hospital context, the experiences of the individual doctors are different. There are within the same challenged contexts doctors that have privileged access to medical databases because of financial grants for instance. What is also clear from the results is that there is lack of collaboration between different departments of the same hospital in terms of access to information resources. The few grants that are received and the information resource benefits they come with are not spread out to all the other doctors. This could also suggest that the hospitals lack the bargaining power for spreading the access to the information resource benefits that come with research and scholarship grants. This conclusion is validated by the claim of Doctor 2 cited below who lamented that there were a number of research projects that were taking place in their hospital which he was not aware of and yet he is the Director of the Clinical Services of a big urban referral hospital:

*I would sum up the major challenges for definition and satisfaction of information need of clinicians at our hospital as lack of local clinical research collaboration. Whatever research is done at our hospital by academicians or specially funded affiliates is not accessible to us. It is published elsewhere and we obviously need the Internet again to access a study that was conducted within our premises. The funny thing is that sometimes you bump into things that were done at your hospital as you browse the MEDLINE database and yet you are not aware that there was this kind of research taking place at your hospital. Sometimes you meet people at a local or international workshop who are congratulating you for some research that was done at your hospital and yet you are not aware of it because its results were not shared to you. This kind of challenge relates to lack of collaboration between those doing research that was funded by donors and us the government clinicians on the ground (Doctor 2 interviewed on 1<sup>st</sup> October 2015).*

Thus from the results, it is clear that the doctors who are researchers, residents (i.e. master's degree students in specialist programmes) and lecturers are more privileged than those who are engaged in clinical practice alone without being connected to some research project. The key argument here is that the information contexts of the doctors in Malawi vary from doctor to doctor even if the doctors would be working at the same hospital. The extent to which the local context is pivotal to the understanding of the context of need of the doctor as an information seeker is probed further in subsequent sections when reflecting on the value of Wilson's model of information behaviour.

## 7.8 INFORMATION SHARING

The qualitative component of the study also assessed the nature of information sharing channels that were available to the doctors and whether they were effective in supporting the information behaviour practices of the doctors in a positive manner. The data were collected during the individual interviews with key informants under the information sharing theme. Each doctor was asked: ‘Are there information sharing channels at your hospital such as meetings, workshops, membership of professional bodies? How effective are they in helping you to improve your clinical decision-making?’ The responses to these questions were very similar for doctors from both rural and urban areas and the following themes were identified as relating to information sharing channels:

- Routine hospital meetings
- Morning meetings
- Death audits
- Departmental meetings
- Grand rounds
- Interdepartmental meetings
- Workshops (local and international)
- Seminars (local and international)
- Internationally collaborated projects

The doctors indicated that the routine meetings in the hospitals are vital for information sharing. Examples of such routine meetings were given as: morning meetings where all categories of clinical staff meet to review the patients case by case; death audits where clinical staff members meet to discuss deaths that occurred, their causes and what they could have done to prevent them; departmental meetings; inter-departmental meetings; and grand rounds<sup>15</sup>. Apart from the routine meetings, workshops and seminars (conducted both within and without the hospitals), conferences (local and international) were also reported as main information sharing channels.

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<sup>15</sup> Grand rounds refer to the times when doctors from all the departments of the hospital review patient cases together unlike the normal rounds where doctors concentrate on their particular departments and meet within that department.

The following responses were selected on the basis of the value they placed on information sharing and information sharing channels. These were from Doctor 15, a specialist in paediatrics and a lecturer at College of Medicine, Doctor 4 a district medical officer from a rural government hospital, and Doctor 17, a specialist in emergency medicine from an urban government hospital who is also a lecturer at College of Medicine.

Doctor 15 explained how she uses these information sharing channels as conduits for getting answers to the things that challenge her in her clinical duties:

*We have the morning meetings, the ward rounds and even the other routine meetings at the hospital such as mortality and morbidity meetings and the grand rounds which are the inter-departmental meetings. I benefit from these and for sure if I come across cases which challenged me, I present such cases to these meetings and get a feel of how others look at the same. That is where the benefit is (Doctor 15, interviewed on 28<sup>th</sup> October, 2015).*

Doctor 4 is from a rural government hospital. He explains how his resource limited hospital has benefited from the partnership meetings and general interactions with Médecins Sans Frontières (MSF). MSF has linked the doctor's hospital to consultants in the Republic of South Africa (RSA) who electronically help by interpreting the X-rays from this rural hospital. Doctor 4 explained:

*We are privileged at this hospital because we have got the services of Tele-radiography where we link up with our partners in the Republic of South Africa. I need to say that this was facilitated by the MSF again. Through the tele-radiography partnership we are able to send X-Rays to the Republic of South Africa and our partner doctors there who are specialists interpret these X-Rays for us and they send back the interpretations electronically. We then implement the advice that they give us on the ground. This is a form of consulting human sources but through electronic channels as opposed to consulting them in person. Our hospital also relies on morning meetings as the most popular information exchange channel. To us morning handover meetings are a very integral part of the clinical care. Then we do have meetings where we have presentation from the departments. Every Friday we hold a department audit meeting. Every Wednesday we do have lunch hour clinical meetings. Then we also do have hospital journals although of late we are lagging behind in this area. Information is also exchanged through training supported by our partners. They do programme specific training in the area of HIV and AIDS. They conduct refresher training for all of*



*us so that we should not lag behind the new developments in our field. We together with our partners on the ground also organise initial training programmes with members of staff. Training is also conducted when there are new protocols. Although I have talked about all these information sources and channels, the most difficult thing for me is to evaluate the information that I obtain from the Internet. I find that to be very difficult and I am not good at exploring all the other electronic medical databases that could be available. I am not a member of any library like College of Medicine Library and up until now I did not know that as one of the alumni of the College of Medicine I had the right to be a member and access their books and databases (Doctor 4; interviewed on 3<sup>rd</sup> October 2015).*

Apart from confirming a number of means to share information, Doctor 17, a specialist in emergency medicine who is from an urban government hospital emphasised the benefits that she gets from international professional networks and conferences. She explained:

*As a doctor I depend on morning meetings, the ward rounds, the grand rounds, the interdepartmental meetings and the many other routine meetings that take place in the hospital. Professional meetings both local and international are very vital for us as doctors. I value the international conferences that are organised from time to time within my subject field. Whenever I go to international conferences, I use time to update myself on the latest issues in my profession. You know at such international conferences publishers come around and display their stands and the like. I follow the publishers in a bid to understand what latest publications that they have for us. I am a member of the professional associations within my field. I value the electronic forums for the professional groups and I find that I learn a lot from these. It is better than just sitting around over here in Malawi without knowing what is happening out there (Doctor 17 interviewed on 28<sup>th</sup> October, 2015).*

Despite operating in information resource limited environments, there are many information sharing channels that a doctor in Malawi could benefit from.

### **7.9 EVIDENCE-BASED MEDICINE (EBM)**

Data on information behaviour practices, and its bearing on EBM practices, was collected by using the responses to question under EBM of the interview schedule for the key informants. The following questions were put to each key informant: What is your understanding of EBM? How do you feel about applying EBM in your clinical work? Do you think EBM can make a difference to the clinical decision making of doctors? How do you think your attitude

to EBM influences how you look for information as a doctor working in Malawi? How do you think your attitude towards EBM influences how you use information in your clinical work as a doctor in Malawi? Each doctor's response was unique in their own way. Two doctors' responses stood out.

Doctor 3, a specialist working at an urban government hospital, complained about the lack of a black and white policy besides blaming the Ministry of Health for focusing more on input based management than outcome based management:

*Evidence-based medicine is about studies that tell us as doctors about what works well in our clinical situations and so guides us in the decisions that we make. I personally believe that all hospitals are in a way engaging in the process of evidence-based medicine because we are given the guidelines by the Ministry of Health for example for treatment. There is a whole Malawi Standard Treatment Guidelines book which is updated based on the research evidence that takes place. You can see that I already have the 2015 edition of this guide book on my desk and I believe every hospital has got it by now. This is a form of evidence-based medicine. The only problem is that we do not have a black and white policy stipulated for all with a clear follow up mechanism on whether it is being implemented or not. I would go back to what I said earlier on about the systems of the Ministry of Health being more about monitoring the input based than about monitoring the outcomes. I feel it is on account of this that the Ministry of Health itself is not implementing or monitoring by way of policy whether such paradigms as evidence-based medicine are being followed or not. While I believe in the importance of evidence-based medicine, I would emphasise that the human face of the doctor is very important in medical practice. We don't need to be too mechanical. We should know that the relationship between a doctor and the patient alone can go long way into making a patient feel better and indeed in some cases even be cured of their diseases (Doctor 3, interviewed on 2nd October 2015).*

Doctor 17, a specialist in emergency medicine from an urban government hospital who was also a lecturer at the College of Medicine emphasised the need to combine EBM and experience:

*My understanding of EBM is that it is the judicious and intentional care of the patient where a doctor is careful to use the scientific evidence that promotes the best care for the patient. If you ask me about whether the understanding of EBM can improve the health services in Malawi, I would say yes on the one hand while on the other I would*

*insist that EBM itself needs to be coupled with experience and good understanding of the EBM five steps such as; a), b), c), d) and e). Do we all understand these steps? I don't think every doctor in Malawi understands them and not everyone has access to the research evidence that falls into all these categories. Again I would say that EBM plus information itself (head knowledge) is not enough. Mere knowledge of EBM is not 100% solution to the health services problem; we need EBM plus the experience. (Doctor 17, interviewed on 28<sup>th</sup> October, 2015).*

The responses underline the fact that doctors in Malawi are aware of EBM besides revealing the fact that EBM as a policy ought to be enforced.

The results of this study also showed that doctors in Malawi are influenced by EBM in order to define their needs. Although this study did not come up with quantifiable results on the extent of influence, it managed to establish the link between EBM and the definition of information needs of the doctors in Malawi. For instance, both Chapter 1 and 2 of this study pointed out that The World Health Organisation [WHO] (2017) lobbies for both the introduction and upstaging of EBM resources in Malawi. One key area that was pointed out was the establishment of more information resources. A better description of the link between the wishes of The World Health Organisation and the Malawi Ministry of Health was captured well through the narrative from Doctor 15, a Specialist Paediatrician who also lectures at the College of Medicine of the University of Malawi when she said:

*I believe there is evidence-based medicine in Malawian hospitals which influences the way we define our information needs. You see the Ministry of Health is guided by the World Health Organisation (WHO) protocols and procedures. WHO sets guidelines and protocols for the countries based on the evidence that was found through credible research. Even when we talk about the management and treatment of such diseases as HIV and AIDS, malaria, pneumonia and the others, for the Ministry of Health to come up with The Malawi Standard Treatment Guidelines for the hospitals, it depends on the feedback from the researches that were credibly conducted. From this angle therefore I believe that there is evidence-based medicine being practised in our hospitals and that we doctors are influenced by it in our information definition, seeking, searching and use (Doctor 15 interviewed on 28<sup>th</sup> October 2015).*

All the key informant interviews indicated in their narratives the use of the Ministry of Health Guidelines such as the Malawi Standard Treatment Guidelines (2015) which is a Ministry of Health publication and the latest version is the fifth edition.

## 7.10 DOCTORS' OPINION OF EBM

Qualitative data on the doctors' opinion of EBM was also collected through question 10 of the questionnaire in the quantitative approach that requested the doctors to give their opinion of the following statement: 'Evidence-based medicine is said to be a health delivery approach that has the potential to improve the health delivery system of developing countries like Malawi.'

The responses below summarise the views of all who strongly agreed or just agreed with the positive prospects of EBM in Malawi. The responses all reflect different issues and a summary of the themes from those who agreed with the statement is listed as follows:

- EBM reduces morbidity
- Helps apply reliable evidence
- Helps better diagnosis
- Improves patient care
- Helps give right treatment
- Saves lives, money and time
- Manages medical conditions
- Cost effective
- Up to date with medical trends

The verbatim quotations from the doctors who agreed with the statement are presented as follows:

- *I agree with the above statement because EBM helps the health services to reduce morbidity.*
- *EBM was proved to produce good outcomes in other settings and there is a high probability that it can do the same here since it helps us to apply reliable evidence.*
- *EBM helps us doctors to do a better diagnosis since it is based on reliable evidence.*
- *EBM has a direct bearing on the improvement of the patient care because it involves use of current evidence from research to improve patient care.*

- *EBM helps us to give the right treatment to the patients because medicine is dynamic and as doctors we need to gather and read the new evidence.*
- *Better EBM interventions that are up to date will mean more lives saved, more money saved and more time saved as EBM helps to pin point what the problem is instead of wasting time with the irrelevant. It is therefore good for resource limited countries like Malawi.*
- *It helps inform doctors about the best current ways of managing medical conditions in terms of efficacy and recognised side effects.*
- *It is cost effective for a country with limited resources like Malawi because you are using methods and clinical ideas that have been tested before and that actually work.*
- *Things are changing every day and lifestyles are also affected by this change therefore we need to adapt our thinking.*
- *To apply the latest research findings in healthcare delivery, gives Malawians access to the best management methods, technology or medical knowledge.*

The explanations from the doctors who disagreed or strongly disagreed with the statement on the positive prospects of EBM revealed three main types of reasons. Some doctors indicated that they were ignorant of EBM, others doubted the potential of EBM in Malawi due to Malawi's lack of expensive technological resources that go with EBM and still others just doubted the applicability of Western evidence in the Malawian context. The responses below are a summary of the major themes that came out from the doctors who disagreed or strongly disagreed with the statement on EBM:

- Doctors experience is cheaper than EBM
- EBM resources biased with western content
- Political influence behind EBM
- EBM too expensive
- Ignorant about EBM
- More talk than practice on EBM
- More clinical research but less application
- Limited resources

- Ethical challenges
- Less EBM content on Malawi

Again a spectrum of verbatim quotations is presented as follows:

- *A lot of people (doctors) use their own experience to treat patients and they may not change that position in the face of new practices like EBM.*
- *Almost all of EBM information is Western-based with little information from countries like Malawi.*
- *EBM in Malawi sometimes has political influences involved. For example, the implementations of some drugs like malaria treatment (in my opinion).*
- *Yes I agree EBM is the way to go as a health delivery system but the only exception is that it is too expensive and Malawi being a poor country opts for cheaper ways.*
- *I have heard about EBM but I have never experienced it so I am not in a position to give helpful comments on this matter.*
- *In Malawi we don't really rely on EBM because people are busy talking more about it and yet less is done.*
- *EBM may be difficult to implement in Malawi using Western evidence because numbers speak volumes if you are to compare mortality in developing countries compared to mortality in developed countries where the EBM was practiced.*
- *EBM can work only if clinical research findings are used to aid delivery of optimum care to patients but I do not think that is being done at the moment because although research studies in Malawi have produced the evidence little is being used.*
- *Potential being the key word, there is need for more research that publishes findings originating locally, but EBM is unquestionably important and lack of local evidence shall always be the challenge for Malawi.*
- *EBM may be hard to implement for resource limited country settings like Malawi because they may not source drugs or technologies suggested by EBM itself.*
- *Sometimes evidence might lack due to ethical challenges that might exist for one to study some issues and this would be the reason why EBM would be difficult to implement in Malawi.*

- *EBM allows accurate diagnosis and better management but there are very few studies done in Malawi.*

### **7.11 DOCTORS' SELF RATING OF THEIR INFORMATION SEARCH SKILLS**

The responses of the doctors revealed their self-assessment of their information search skills although this was not originally part of the key informant schedule. The themes that were observed included:

- Good skills (Doctor 10, Doctor 14, Doctor 16)
- Average or I am okay (Doctor 16)
- Below average i.e. needs improving (Doctor 13)
- Not good at using electronic resources (Doctor 11)
- Never used the Internet (Doctor 7)

The verbatim quotations of the above selected doctors are presented below. It should however be noted that of the twenty interviewed doctors only two forthrightly indicated that their information search skills were bad or they had never used the Internet:

*I am not quite keen on using the Internet and I would be very honest if I said I don't use the internet. Even in my college days I was not keen on using the Internet. All the two and half years I have been practising I have never used the Internet (Doctor 7 interviewed 3<sup>rd</sup> October, 2015).*

*I am okay and I consider myself as having good skills (Doctor 11 interviewed on 20<sup>th</sup> October, 2017).*

*I think I would describe myself as someone who is just average in terms of electronic skills. I am certainly not above average and neither am I below average (Doctor 13 interviewed on 12<sup>th</sup> October, 2017).*

*I would say that they are good. I am generally okay...Doctors look for information all the time and the thing is that they have to get that information from credible sources. Even if they were attempting to source it from credible sources, are they using the proper search skills and are they able to appraise the information that they find. From this angle, the information seeking behaviour of doctors has a direct bearing on evidence based medicine (Doctor 14 interviewed on 20<sup>th</sup> October, 2017).*

*I look at the EBM challenge in Malawi as access to information. Of course beyond the access problems we could talk about whether the doctors are able to locate and use the*

*sources of information or further if they have the skills to do that. Access to information remains the major barrier to the practising of EBM. Even if doctors had good search skills but if they do not have access to information, EBM can't work. If the challenges that I have talked about would be solved, then it would be easy to practise EBM (Doctor 15 interviewed on 28<sup>th</sup> October, 2015).*

*Doctor 16 "I feel I am okay or do you have a standard that you want me to assess myself against?" (Doctor 16 interviewed on 28<sup>th</sup> October, 2015).*

*I guess the other challenges are that my information search skills need to improve and I need for example to know how to use the other search engines that are better than the ones that I use (Doctor 17 interviewed on 28<sup>th</sup> October, 2015).*

## **7.12 CONCLUSION**

This chapter started by describing the profile of the participants followed by an explanation of how the interviews were conducted. The chapter also discussed how thematic analysis and coding were used to identify themes that linked to this study. Data that related to the five overarching themes namely: doctors and information needs, information seeking, information sources and preferences, information sharing and information sharing channels in hospitals, and evidence-based medicine (EBM) and doctors' understanding of EBM were presented. Where applicable, sub-themes were identified. Verbatim citations of responses from the doctors that supported the overarching themes were presented. The chapter demonstrated that the qualitative approach to the study revealed some unique data that was not discovered by the quantitative approach only. Chapter 8 discusses and triangulates both the quantitative and the qualitative results, as well as findings from the literature.



## CHAPTER 8. DISCUSSION AND TRIANGULATION OF RESULTS

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### 8.1 INTRODUCTION

This chapter discusses the results on the information behaviour practices of doctors in Malawi. It interprets the results presented in Chapters 6 and 7, and triangulates the findings with empirical studies reported in the literature reviews of Chapters 3 and 4. The chapter also discusses the applicability of Wilson's 1996 model of information behaviour within the Malawi context, as well as the implications of the study results for EBM modelling and its implementation in developing countries like Malawi.

### 8.2 TRIANGULATION OF FINDINGS FOR EACH SUB-QUESTION

This section triangulates the study results in relation to the research sub-questions and key issues are raised under each aspect of the research sub-question. As indicated in the previous chapter the six sub-questions that guided the study are:

1. How do doctors in Malawi define their information needs?
2. What are the information seeking preferences of doctors in Malawi?
3. What are the doctors' self-assessments of their information searching skills?
4. What are the information sources that doctors in Malawi consult?
5. To what extent do doctors in Malawi use the information they source to inform their decision making process as a way of implementing EBM?
6. How can an understanding of the information behaviour practices of doctors in Malawi inform EBM practices?

#### 8.2.1 Doctors and definition of information needs

Several findings were reported with regard to doctors and their recognition and definition of information needs. Many of these are confirmed by reports from the literature, but not necessarily in the context of information behaviour. The following findings are important:

- Doctors collect information from their patients and ask questions in order to source primary information from patients. Primary information is also gained from referral notes, hospital rounds. Primary information is essential for decisions on diagnosis and treatment, and can stimulate information needs. The importance of questions, answers and question negotiation was prominent in the narratives of the doctors although this was not an issue covered in the interview schedule. The common practice for doctors to ask questions in order to gather information from their patients and the impact this has on defining information needs was also reported in research by Flynn and Guinness (2011) and González-González, (2007).

- In the Malawian context two types of patients are prominent for their impact on how doctors recognise and define information needs: (i) *enlightened* patients who help them to define information needs, and (ii) *illiterate* patients who passively respond to the questions they are asked without or with limited additional input. Mayer (2010), Satterfield *et al.* (2009) and Hokkanen (2007) also expressed concerns about the differences between illiterate and literate patients. The patients who are between the extremes of the literate patient and the illiterate patients would fall under different scales of literacy. It should be noted that scales of literacy for the patients did not feature prominently in this study but it could be revealed by a wider study focusing specifically on the information behaviour practices of patients.
- The doctors define their information needs in four stages. In the first stage they ask patients questions. In the second stage they relate the information they gather to their personal clinical experience to diagnose and treat the patients. If they fail in this, they consult people and printed/electronic sources of information during the third stage. This third stage may bring more information needs in which case they consult more information sources in various formats. In the fourth stage they use the information they found to make clinical decisions. The findings revealed that even after the diagnosis is made and treatment is given, the process of managing the disease may instigate more information needs e.g. because the treatment is not working or is having side effects. (This may lead to a need for on-going searches for information). Information needs, as argued by Wilson (1999:251) may then be secondary needs where the effective treatment of patients is a primary need. Figure 8.1 is a diagrammatic representation of the stages that doctors in Malawi typically goes through while defining clinical information needs.
- Results from the quantitative as well as qualitative data confirm the finding of Galimoto (2007) that doctors face a vast array of information needs (see section 7.5 where several themes on the information needs of doctors are discussed). Needs were very often associated with uncertainty.
- Some information needs evident from this study are more typical of developing countries e.g. information needs based on the need to improvise in clinical procedure because the preferred option is not available due to limited resources. Abeyseena *et al.* (2010) in Chapter 4 and Babu (2008) and Hisham *et al.* (2016b) in chapter 2 highlight the resource challenges that doctors from developing countries encounter.

**Figure 8.1 Stages in the Malawian doctors’ definition of information needs**

Stage 1	Ask the patient questions in order to solicit primary information. Primary information can also be gathered from documented medical history.
Stage 2	Relate the primary information gathered in stage 1 to their clinical experience.
Stage 3	Where the clinical experience is confounded, consult human (i.e. people) or non-human (print/digital) sources of information.
Stage 4	Make a clinical decision and monitor treatment which may bring more information needs.

### 8.2.2 Doctors and information seeking preferences

Several findings have been reported with regard to the information seeking preference of doctors in Malawi. These findings are supported by reports from the literature and in this regard the following points are highlighted:

- Doctors in Malawi prefer seeking information from specialists they are working with; these are normally specialists in the particular field where the patient’s problem lies. Those who are working in solitary places use cellular phones in three ways; as tools for information seeking on the Internet, for calling the specialists from whom they seek help for contacting them through social media. Parboosingh (2002) indicates that doctors learn from communities of their practice and from colleagues. The overdependence on human sources and Google seems inevitable for the doctors given the fact that the hospital contexts in Malawi are not adequately supported by information resources as described by Lwanda (2007).
- The majority of the doctors studied also prefer to seek information using such general search engines as Google than databases such as HINARI. It should be noted here that almost all the doctors who indicated that they use Google indicated that they use their cellular phones to access open access databases such as MEDSCAPE. This confirms the hope for improvement that was raised by AirTel Malawi’s (2012) 3G networks in chapter 2.

- The study confirmed that the information seeking behaviour of doctors in Malawi is hardly supported by the hospital libraries. This is supported by the lack of popularity of books and medical databases in the quantitative results in Table 6.7 section 6.6.2 and the reference to poor resources in the qualitative results in section 7.6.2. These findings confirm the poor condition of government hospital libraries. The lack of electronic information resources is a historical problem (as also pointed out by American Peace Corps (1989), Muula (2003) and Masanjika (2010)) and is yet to be resolved. However, doctors who are not affected by this problem are the ones that combine their clinical work in government hospitals with teaching at College of Medicine of the University of Malawi because the College Library supports them with access to the Internet and important information resources such as HINARI and PUBMED. The information seeking patterns of Malawian doctors also reveal their desire to go beyond asking questions to patients to enable them to gather information for diagnosis and treatment. Some doctors also try to seek further information in order to manage the patient. Previous studies by Bussières *et al.* (2015) and Swennen *et al.* (2013) also show that EBM steps in section 3.2 encourage doctors to go beyond asking questions.
- The clinical duties of doctors in Malawi (and expectations from EBM) activate the need to go beyond asking the patient questions. However, the study showed that the awareness of the five stage questioning model, self-efficacy and creativity regarding such initiatives differ from one doctor to another. This is why this study agrees with Niedźwiedzka (2003) that it is important to specify the actual activating mechanisms such as stress, perception of risk, and hope for reward, and perceived level of self-efficacy rather than just speculate on each of these.

### **8.2.3 Barriers to information seeking**

- The quantitative and the qualitative results (in sections 6.6.1 and 7.6.2 respectively) reported on barriers to information seeking. The findings illustrate that it is one thing for the doctors in Malawi to have a good attitude towards EBM where they are able to define their information needs and it is yet another thing for them to be able to practice it (i.e. seek/search for information and use it) because of the barriers that stand in their way. Many of these are confirmed by the barriers portrayed in the empirical studies cited in this study e.g. the reports by Babu (2008) and Masanjika (2010) in Chapter 2, Abeysena *et al.* (2010), Zeidan and Behairy (2010), and Hisham *et al.* (2016) in Chapter 4. Although the attitude towards EBM and barriers to information seeking varies from doctor to doctor, the following key barriers are highlighted as the most important ones:

- Lack of time due to a heavy workload remains a big barrier in Malawi as evidenced in section 6.3.6 of the quantitative results and 7.6.2 of the qualitative reports. The findings clearly show that most doctors do not have free time to even go beyond asking basic questions. This confirms concerns of Abeysena *et al.* (2010:86) in section 3.4.2 about lack of time as one of the key barriers to EBM.
- Work and patient overload is the second major barrier to information seeking as revealed by the average number of patients a doctor sees per day and the qualitative response of the doctors highlighted in section 7.5.1.3. The quantitative results in section 6.3.7 show that on average a doctor sees about 37 doctors per day. Zeidan and Behairy (2010) also reported that 85% of the doctors they surveyed in Sudan indicated that overload had a direct bearing on the lack of time that the doctors had.
- Lack of both material and financial resources is another major barrier. This confirms the reality behind the research questions in section 1.4 of this study that the challenges in Malawi could affect the information behaviour practices of doctors and their ability to implement EBM. It agrees with findings by Salinas (2003) that poor information resources puts developing countries on the disadvantaged side of the digital divide. Consequently, the doctors cannot adequately identify literature as proposed by Mayer (2010) in section 3.3 of this study which further denies them the chance to access the different types of evidence as depicted in Table 3.1 of this study.
- Further to previous points, the lack of local medical databases that are relevant to the Malawi medical environment frustrates the information seeking processes of doctors in Malawi. The qualitative narratives summarised in section 7.6.1 revealed that most of the content in databases like MEDSCAPE were Western. The ability by the doctors to assess and understand MEDSCAPE as having more leaning towards Western content is a demonstration that doctors in Malawi have the capacity to evaluate the information they found. This agrees with the quantitative results in section 6.5.1 in Table 6.5 where many doctors indicated that they were either very good or good in the five steps of EBM. However, the concern about the domination of western content (i.e. the lack of documented African (medical) evidence) resonates in part with the debate raised by the differences of the Western information culture (i.e. collective culture) and the African information culture (i.e. the collective information culture) raised by Mosse and Byrne

(2005:228) and Mawere (2011:22). It is, however, to be proved by further research to what extent the belief in collective information culture (often expressed orally) contributes to the absence of local clinical evidence. This study did not deal with this, but this is something that future studies can examine.

- The results further showed that the attitude towards EBM and information seeking barriers also differs from one doctor to another. Furthermore, each doctor perceives information seeking challenges and how to come around them differently as demonstrated earlier through Doctor 6 in section 7.6.1 and Doctor 7 in section 7.6.2. They both came from the same rural hospital whose library and Internet services are not functioning and yet Doctor 7 drives into town for Internet access while doctor 6 is not keen on using the Internet.

#### **8.2.4 Doctors' self-assessment of information searching skills**

Some results from the doctors' self-assessment of their information searching are also supported by the literature cited in Chapters 3 and 4. The study observed the following:

- Doctors in Malawi assessed themselves to be doing fairly well in the five stages of EBM which takes them through core issues of information search skills such as framing questions, identifying literature, assessing the quality of information, summarising evidence and interpreting the findings as depicted by Mayer (2010:14). There were 93 doctors out of 156 (59.6%) doctors who indicated that they were trained in EBM and 142 doctors out of 160 doctors (88.8%) indicated that they applied EBM at their work place as shown in section 6.4.1. Over 75% of the doctors indicated that they were very good and good in all the stages of EBM as shown in section 6.5.1 of the quantitative results. This confirms the argument raised by Abeysena *et al.* (2010) in section 3.4.2 of this study that doctors' training in EBM fosters good attitude towards EBM.
- There is further evidence that doctors in Malawi think highly of their skills to search and use medical databases as demonstrated in section 6.6.4 where 136 of the 163 who responded to the question on use of medical databases indicated that their skills to search selected databases are very good and good. This confirms Cullen's (2011) argument (section 4.4) that if doctors are trained properly in their undergraduate years, they retain a positive attitude towards EBM even during the practising years.
- The doctors in Malawi were confident and were purposive to use selected medical databases. For example, if in Table 6.8, the column for 'purposive to use' (i.e. were confident and had the intention to use) the databases are arranged in order of the most

popular to the least popular, one establishes that 161 doctors are purposive to search and use Google followed by UpToDate (105 doctors), HINARI (91 doctors), Google Scholar (88 doctors) and COCHRANE (92 doctors). This suggests that the doctors had the desire to search databases that were accessible to them and that this depended more on the information behaviour practice of the individual doctors. This is in agreement with the results in the qualitative data where Doctor 19 in section 7.5.1 and Doctor 14 in section 7.5.15, for example, indicated that apart from contacting colleagues they use Google.

- The popularity for using UpToDate medical database can be related to the benefits hospitals receive from their partnerships with Western countries such as reported by McNairy *et al.* (2010) in section 3.4.2. This is similar to the relationship between MSF and rural hospitals described in section 7.8 by Doctor 4 and Doctor 16 in section 7.7.1 who used HINARI as a medical database which is sponsored by WHO as explained by Masanjika (2010) in section 2.6. While such partnerships help doctors access some medical databases and thereby create an environment for improvement of their search skills, it takes good collaboration on the ground and a personal desire on the part of the doctors for them to learn.
- HINARI is a reliable and trustworthy medical database sponsored by WHO and available for free to all health institutions in Malawi as reported by Masanjika (2010) in section 2.6. One would assume that doctors in Malawi would be familiar with this database, that they would often use it, and that they would feel confident about their search skills. However, the exploitation of HINARI depended more on the enthusiasm of the individual doctor and their individual information seeking skills. The example here is Doctor 6 in section 7.5.1.3 who although he works at a hospital that does not have HINARI, he drives into town to an Internet Café to access HINARI while his counterpart Doctor 7 in section 7.6.2 acknowledges that he has poor electronic search skills and depends more on books.
- Problems are, however, experienced with registration for using HINARI and sharing the identification and password with all doctors, lack of training, lack of knowledge of the database structure and whether full texts or abstracts are included, and restriction of registration so that HINARI can only be searched from selected computer workstations. Masanjika (2010) in section 2.6 reports similar findings. This is the intervening variable in the information seeking process of those who may have the information searching skills but don't have access to HINARI itself for the reasons that have been given above.

In this regard, the qualitative responses summarised in section 7.5.1 established that there are four categories of doctors based on the way they assessed themselves in their searching skills and these are presented as follows:

- Doctors who mastered searching skills as undergraduates in their practising years e.g. Doctor 12 who mastered the use of MEDSCAPE when she was an undergraduate student. This result supports the recommendation by Zeidan and Behairy (2010:5) that EBM training should be embedded in both undergraduate and postgraduate training.
- Doctors who have search skills and who know what commercial medical databases to search but who are not using those skills due to workplaces that do not provide access to these; they thus search Google or Open Access databases (e.g. Doctor 19 in section 7.5.1 and Doctor 14 in section 7.5.15). This is in agreement with findings from Hisham *et al.* (2016b) and Leckie, Pettigrew and Sylvain (1996) (see section 1.2). Such findings confirm that while EBM holds a lot of promise it would be difficult for doctors operating in challenging contexts to implement even if they had good skills.
- Doctors with poor searching skills were not good in their undergraduate years but who had to catch up during their postgraduate years, now use what they learnt or are still learning in their postgraduate training. This relates well to the argument by Zeidan and Behairy (2010:5) that even postgraduates should be seriously trained in information search skills.
- Doctors who don't have any searching skills for electronic resources at all and are not using the Internet in their practice. These are doctors who did not receive information literacy training on undergraduate or postgraduate level. They depend on people and books for information. This relates to findings by Abeysena *et al.* (2010) in section 3.4.2 that many doctors in developing countries cannot implement EBM because they did not receive appropriate training.

While doctors in Malawi thus are confident about their information search skills, the most advantaged doctors are those who have the searching skills for both subscription and open access databases. They are able to cope with any environment with resource limits whether in rural or urban hospitals. Where no subscription for medical databases is available, they resort to using open access databases through their cellophanes. The varying levels of search skills among the Malawian doctors affect their information seeking behaviour.



### 8.2.5 Doctors' preferences of information sources

Results on the preferences of doctors in Malawi for information sources confirm the reports from the empirical studies covered in Chapters 3 and 4. The following key points stand out from the quantitative and the qualitative findings:

- Specialists that are senior to a doctor are very important as a human information source in Malawi. The quantitative results in section 6.6.2 showed that 80 doctors indicated that they use specialists senior to them as an information source daily or at least several times a week. The importance of specialists who are senior in the ranks of doctors as information sources is further supported by qualitative enquiries that also elaborate that doctors consult specialist friends either through mobile phone calls or through the social web such as WhatsApp. This is understandable given the lack of alternative sources due to poor state of libraries and ICT infrastructure of the hospitals as pointed out by American Peace Corps (1989), Muula *et al.* (2003) and Masanjika (2010). Thus it is evident that contextual variables can shape the doctors' preferences (information behaviour) for human sources under the circumstances.
- Google and other free search engines have become vital information sources for doctors in Malawi. The popularity of Google is evidenced in the quantitative results in section 6.6.2 by the fact that 161 doctors of the surveyed doctors in Malawi indicated that they use Google daily or several times a week. Google is also indicated as a popular information source in the qualitative results as pointed out by a number of doctors who said they used Google and MEDSCAPE as information source on their mobile phones. This confirms the assertion by Airtel Malawi (2012) in section 2.12 that it's 3G network (which has now been upgraded to 4G), has a lot of potential to aid communication and information sourcing by doctors.
- There are great benefits such as access to critical information sources (e-resources, books, human sources) that Malawian doctors stand to get from the North-South partnership. Partnerships such as the WHO's Research4Life project that promotes access to the HINARI database are held in high esteem by Masanjika (2010) in section 2.6 of this study. The results of the quantitative study in section 6.6.3 show that doctors were very good and good in using HINARI database as an information source. The quantitative results also show that doctors indicated that they were very good and good at using UpToDate (another clinical information database accessed through partnership with the North). Doctor 4 in section 7.7.1 of the qualitative results indicated that he enjoys consultations with a Specialist from Republic of South Africa (RSA) through the

partnership that his hospital has with MSF. Finally Doctor 16 in section 7.6.1 indicated that partnership were behind the popularity of current and relevant hardcopy surgery books that he had access to. This could explain why although books were not the most popular information sources on the overall rating, there were a number of doctors that indicated that they use books daily or at least several times a week (taken in aggregate). This could also be explained by the fact that some of the doctors had duo roles i.e. clinical and teaching roles at the College of Medicine which offers them access to books through its library. The overall observation here is that partnerships or collaborations can affect the Malawian doctors' information use behaviour as demonstrated by Doctor 4 and Doctor 16 above.

- The quantitative results in section 6.6.2 showed that commercial e-resources such as EBSCO and other providers of e-journals which offer access to very rich electronic medical journals are hardly used daily or at least several times a week (if taken in aggregate) by many doctors. The qualitative findings connect this limited use of commercial databases to poor budgets that do not afford the hospitals to pay subscription fees. The American Peace Corps (1989), Muula, (2003) and Masanjika (2010) reported similar findings due to Malawian hospitals' lack of support to the libraries. Therefore, this study observes that it seems evident that a contextual variable, such as poor budgets, affects the information use behaviour of medical doctors in Malawi.

### **8.2.6 Doctors' use of information and EBM**

The results of this study showed a direct relationship between the reasons why doctors need, seek/search for information and how they actually use the information they gather for EBM. The results confirm findings in the literature on doctors and EBM in developing countries such as reported by Hisham *et al.* (2016b) and Abeysena *et al.* (2010). The following are worth noting from findings from this study:

- Doctors in Malawi are aware of EBM, they have a very positive attitude towards EBM and they are willing to apply it as shown in section 6.4.1 of the quantitative results where doctors indicated that they were aware of EBM and that they actually applied EBM. This is further supported by the finding in section 6.4.2 that doctors believed that EBM is a health delivery approach that has the potential to improve the health delivery system of developing countries like Malawi. These findings were also evident in the qualitative narratives in section 7.9 where doctors indicated awareness through the use of the Malawi Standard Treatment Guidelines (MSTG). Despite using the MDTG as a local EBM tool, the doctors agreed that they lacked access to global EBM tools. In this regard, the

findings are in agreement with reports by Abeysena *et al.* (2010) (see section 3.4.2) who found that 30% of the doctors they surveyed were aware of EBM and yet only 8.5% had used it. Abeysena *et al.* (2010) also found that 76% of the doctors they surveyed had a positive attitude towards EBM but only 54% of the doctors were actually using it.

- The claim by Doctor 3 in section 7.9 of the qualitative results that all hospitals in Malawi use the Malawi Standard Treatment Guideline as a local EBM tool is supported by the fact that the quantitative results in section 6.5.2 showed that doctors indicated that EBM was their operational policy which influenced their information needs and the manner in which they used information. Section 6.5.3 of the quantitative results actually shows that almost half of the doctors (77 doctors) indicated that EBM influenced their information needs and the manner in which they used information. The willingness by doctors to use EBM tools within their reach is also observed in the studies by Lu and Li (2013) in China in section 3.4.1, Abeysena *et al.* (2010) in Sri Lanka and McNairy *et al.* (2012) in section 3.4.2.
- Given the fact that the local hospital environment lacks access to the global EBM resources, doctors in Malawi with the ethos and searching skills may go an extra mile to look for evidence and use novel ways to overcome the barriers that stand in their way in order to support the clinical decisions in their hospitals as demonstrated by Doctor 6 in section 7.7.2, Doctor 12 in section 7.7.1 and Doctor 14 in section 7.5.1.4. Doctor 6 drives 15km in order to access the Internet, Doctor 12 uses her cellular phone to reach human and open access sources, Doctor 14 again uses her cellular phone in order to source information from human sources and open access sources in order to solicit information that could help her to improvise in the midst of lack of EBM resources. Literature, as demonstrated by Hisham *et al.* (2016b) shows that the doctors with good information seeking practices and good attitude towards EBM go an extra mile to use novel ways such as cellular phones in order to overcome the barriers they face as they seek to implement EBM.

### **8.2.7 Doctors' perceptions about understanding of doctors' information seeking behaviour and EBM**

The findings have shown that doctors in Malawi believe that understanding of doctors' information seeking behaviour has the potential to inform EBM practices and can improve health delivery services. The link between good information behaviour practices and effective EBM practices is advocated by Hisham *et al.* (2016b) in section 3.1.

- The quantitative results in section 6.5.5 (and specifically the combination of responses for strongly agree and agree) show that 95.3% of the doctors agreed with the statement that, ‘the understanding of the Malawi doctors’ ability to seek and use information has the potential to inform evidence-based medicine practices that can improve the health delivery service’. The qualitative results in section 7.10 also showed that the majority of doctors in Malawi believe that the understanding of the Malawi doctors’ ability to seek and use information has the potential to inform evidence-based medicine practices that can improve health delivery services. These results again are supported by the proposition by Hisham *et al.* (2016a) and Mayer *et al.* (2010) in section 3.3.
- The quantitative results also revealed that doctors in Malawi were either good or very good in all EBM steps (see section 6.5.1). Qualitative results in sections 7.9 and 7.10 showed that doctors believe in EBM; doctors believed that EBM had the potential to improve health delivery services in Malawi. The few, who doubted this statement, argued that Malawi lacks EBM resources, lacks training and is dominated by medical databases with western content. Hisham *et al.* (2016b) suggest in section 3.1 that as much as doctors can master EBM steps, they need to have good attitude towards EBM if it has to improve their health delivery service.

### **8.3 DISCUSSION OF THE SUITABILITY OF FRAMEWORKS GUIDING THE STUDY**

This section utilises the study findings to extrapolate on the suitability of the Wilson model and the EBM models for studies on information behaviour practices of doctors. This is followed by the population of the Wilson 1994 model and suggestions for a slight adaptation of the model.

#### **8.3.1 Suitability of the Wilson 1996 model**

The suitability of the Wilson 1996 model for a study on the information behaviour practices of doctors in relation to EBM in a developing country is being done in relation to the following key areas: context of information need, the person in context, activating mechanisms and intervening variables. This is elaborated in the subsections below.

##### **8.3.1.1 Context of information need**

This study identifies the country of the information seeker as the macro-context. Malawi as a country is facing a number of challenges that are typical of developing countries such as; poor national health expenditure patterns, poor information infrastructure, EBM resources in

the hospitals, poor Internet, poor doctor to population ratio, a young medical school that is yet to develop sub-specialist programmes, lack of specialists in district hospitals and health centres. Malawi also has challenges on following up whether its national health policies such as EBM policy are being implemented on the ground. This study further identifies the hospitals as the meso-context and these too have their own challenges. For example; there are challenges that are peculiar to the type of hospital bearing in mind that the main types are; the public hospitals, the semi-private (CHAM) hospitals and the private hospitals: public hospitals have specialists only at the four referral hospitals of the country while the district hospitals or rural health centre (which serve 90% of the population) are served by general practitioners or clinical officers (para-professionals). The CHAM or semi-private hospitals and private hospitals often have human resource challenges i.e. they depend on doctors from the public hospitals for part time employment. This also explains why in this study, more specialists than interns or registrars indicated that they work at more than one hospital. However, the challenge of information resources needed to support EBM are common to all hospitals in Malawi. This study observes that while the central government has good policy papers on EBM and health information in place, these are yet to be fully implemented on the ground.

### **8.3.1.2 The person in context**

The doctor in the clinical context is regarded by this study as the person in context who experiences job related information needs. The challenges stated in the preceding paragraph which are common to developing countries must be noted for the doctors in Malawi. Due to such challenges some doctors opt to work abroad and this is easily done by those who were trained outside Malawi as they tend to have experienced reverse cultural shock having been in a western clinical context where all resources are provided. The doctors who decide to stay and work in Malawi have to face the challenges before them and circumvent them through use of personal resources or have to come up with innovations for alternative procedures. Therefore based on the context of need within Wilson's 1996 model discussed in section 4.3.2.2 of Chapter 4, this study focused on the clinical context in which the doctors work. Both quantitative and qualitative results demonstrated that the context in Malawi, as a developing country, causes doctors to face many barriers that impact on the fulfilling of information needs and information seeking e.g. heavy workloads, lack of access to information resources, poor or no budgetary allocation to support the use of information resources, poor Internet access, poor or non-existent hospital libraries.

### **8.3.1.3 Activating mechanisms or triggers of information needs**

There are many triggers of information needs experienced by doctors in Malawi e.g. tasks, interactions with patients, quests to make the best diagnosis in the face of uncertainty, needs to ensure effective treatment, the need for quality patient care, need to provide information to patients, need to present information in a language that can be understood by patients, desire for legal and ethical exactness, need for disaster preparedness, scholarly reasons i.e. teaching, learning and continuing professional development and the need to come up with the best choice between two good choices. These triggers serve as activating mechanisms, and some quests such as those associated with making the best diagnosis in the face of uncertainty, and those relating to the need to ensure effective treatment, and the need for quality patient care, are key to EBM as explained in section 3.3.

### **8.3.1.4 Activating mechanisms and intervening variables**

The findings of this study established that the relationship between the doctors with both the intervening variables and activating mechanisms differs from one doctor to another and it depends more on the personal ethos of the individual doctor. Thus, what may be an activating mechanism or an intervening variable for one doctor may be the opposite for another. This is clearly demonstrated in the qualitative results by the way Doctor 6 and Doctor 7 in chapter 7 react differently to the same information needs within the same clinical context that is challenged by the same information seeking barriers. Such findings support the Wilson 1996 model's use of the word 'intervening variable' as opposed to the word 'barrier' which was used in the Wilson's 1981 model. The findings further supports the suggestion by Niedźwiedzka (2003) that Wilson's 1996 model's four categories of intervening variables (psychological, demographic, role related/interpersonal and environment variables) should be called personal variables. The argument for the term personal variables is further justified by Hisham *et al.* (2016b) who argues that the impact of the variables to activate or impede information seeking depends on the attitude and the information seeking skills of the individual which differ from one person to another. Hisham *et al.* (2016b) further argues that one information seeking barrier can stop one doctor from seeking information, but another doctor may overcome the same barrier with novel methods of information seeking.

The qualitative results of this study also established that it is sometimes difficult to label a variable e.g. as psychological, role related, etc., since intervening variables can overlap, and can be internalised e.g. seeking information to pass an exam or externalised e.g. seeking information to keep up with standard treatment as guided by the MSTG. This is in line with the argument by Hisham *et al.* (2016b) and Niedźwiedzka (2003).

### **8.3.1.5 Environmental variables**

Both macro (national context) and micro (local hospital context) environmental variables were prominent in the qualitative findings (see section 7.5.2.4). Key macro context variables included the diminishing national health budget and national health expenditure. Key micro environmental variables included the lack of information and EBM resources due to the lack of support to the information infrastructure in the hospitals which is reflected through lack of working Internet and out-dated or no libraries at all.

### **8.3.1.6 Source characteristics as influencing variables**

Section 7.7.2 of the qualitative findings shows that information seeking behaviour is influenced by characteristics of different sources of information, for instance, demands different search competencies of doctors and in that way they act as intervening variables affecting their (doctors') search behaviour. For example, the level of exploitation of the electronic information sources depends on whether the information seeker has the search skills for the electronic resources on the one hand. On the other hand, easy access to printed sources such as the Malawi Standard Treatment Guidelines to Malawian hospitals means that its access is not limited by the Internet challenges that many of the hospitals had.

### **8.3.1.7 Activating mechanisms of information searching**

Several activating mechanism were noted in section 7.5.1, such as; tasks, interactions with patients, quests to make the best diagnosis in the face of uncertainty, needs to ensure effective treatment, the need for quality patient care, need for self-efficacy, need to provide information to patients, need to present information in a language that can be understood by patients, desire for legal and ethical exactness, need for disaster preparedness, scholarly reasons i.e. teaching, learning and continuing professional development and the need to come up with the best from many seemingly good choices.

### **8.3.1.8 Risk reward theory**

The value of risk reward theory was supported by the study findings. Various risks stimulated information seeking as a way of enhancing a decision that would avoid them. Section 7.5.1 presents some of the risks as; wrong diagnosis or wrong treatment, fear of using out-dated information, fear of being on the wrong side of the law, fear of professional stagnation, fear of academic failure and fear of pandemics such as Ebola. The accessing of the right information was in itself acknowledged as the primary reward.

### **8.3.1.9 Social learning theory**

The value of community support, and asking people for information, is clearly illustrated in section 7.5.2.2. Social learning theory as argued by Wilson's 1996 model can thus be important in a study of the information behaviour practices of doctors in relation to EBM.

### **8.3.1.10 Self-efficacy**

The importance of self-efficacy in studying the information behaviour practices of doctors in relation to EBM was evident in the quest to improvise, to make optimal use of limited resources as demonstrated through Doctor 14 in section 7.5.1.10. The importance of self-efficacy is also demonstrated through the distances that doctors drive in order to look for the Internet as shown through Doctor 6 in section 7.5.1.4. It is also shown through the way doctors use their mobile phones to connect to specials or open access sources from remote places as shown through Doctor 12 in section 7.6.1.

### **8.3.1.11 Types of information seeking behaviour**

The Wilson 1996 model distinguishes between four types of information seeking, namely; attention, passive search, active search and on-going search. This study did not specifically focus on types of information seeking.

### **8.3.1.12 Information processes and use**

The information processing and use activities also reveal information behaviour similar to the application of EBM to solve health related problems as well as delivery of effective health services. It is clear from the findings that the reasons for which the doctors use the information they find to address specific information needs within the clinical context connotes (as outlined in section 7.5.1), that information has to be processed before it can be used. The need to understand the type of evidence that doctors have to access and apply to their clinical situation as outlined in section 3.3 of this study shows that doctors have to process the information they find because they can use it for; diagnosis, treatment, and verification of facts of cases at hand among other things.

## **8.3.2 Revisiting the Wilson 1996 model**

On the basis of the foregoing, this study establishes the following critical points that are used to populate the study in the manner that has been presented in Figure 8.2:

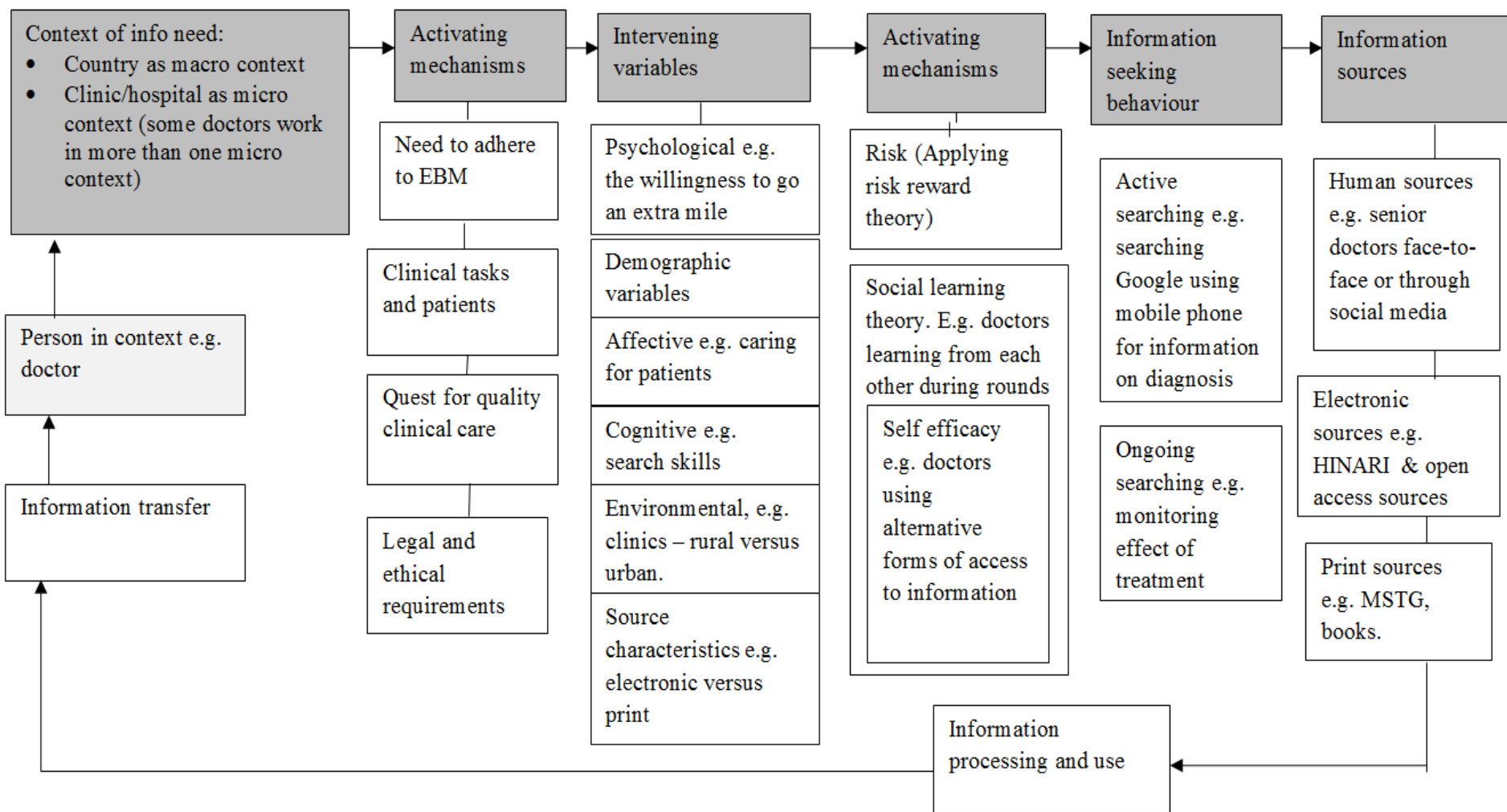
- The context in which doctors' information needs manifest should be understood in terms of the macro and micro level where the macro is country and the micro is (as in this study) the clinic or the hospital where the doctor is working. The key argument here is



that the macro conditions influence the micro conditions and that such a perception helps one to account for the challenges of information seekers in developing countries.

- Although the context of information is distinguished as a single box in the diagram, all information behaviour activities take place in the context of information need.
- Some doctors work in more than one context.
- There are no observable differences between the differences in terms of information activities across the different ranks of the doctors i.e. interns, registrars, residents and specialists. However, the study established that the information seeking behaviour of doctors were different from one to another depending on the information literacy skills and that further determined how each doctor faced the information seeking challenges in their micro context.
- The study's actual examples of triggers or activating mechanisms include: adherence to EBM, clinical tasks and patient feedback, legal and ethical policies of mother institutions, quest for self-efficacy, innovation and improvisation. This is also in agreement with Niedźwiedzka (2003). Such activating mechanisms can be studied by the Risk/Reward theory.
- The decision to look for information is included as an adaptation of the model.
- The intervening variables are referred to as the personal variables which include; the physiological, the affective, the cognitive and the demographic.
- Under information seeking behaviour, the study did not find examples of passive attention and passive search. The study has however given examples of active search and on-going search.
- Sources are seen by this study as part of the environment of the information seeker and therefore part of the context of information needs as argued by Niedźwiedzka (2003).
- The person in context is seen by this study as the doctor in the clinical environment.
- However, the adapted diagram separates sources in order to demonstrate graphically the examples of the sources that the doctors used.

Figure 8.2 Populating Wilson’s 1996 model of information behaviour (IB) with findings



### **8.3.3 Suitability of the EBM model**

The EBM model in Figure 3.1, then adapted in Figure 3.2, guided the study in terms of understanding the relationship among the three traditional sources of information that support clinical decisions, i.e. the doctor's clinical experience, the patient's values and patient's preferences and the clinical evidence.

Findings showed that an EBM model can influence information seeking behaviour of doctors in a developing country. The findings established that the Malawi Ministry of Health on paper requires all the hospitals in Malawi to implement EBM policies as evidenced through the ministry's provision of the Malawi Standard Treatment Guidelines books to all the hospitals. The findings also showed that the doctors expressed the need for clinical evidence, but the needs were mostly unmet because of lack of EBM information resources. Thus the implementation of the EBM policy differed from doctor to doctor, just as it differed from hospital to hospital. This confirms the limitation of the clinical experience of doctors in Malawi in face of complicated diagnosis, treatment or challenges arising from lack of clinical resources that support decision making. The findings also established that doctors in Malawi depend on primary sources of information such as asking the patient questions and looking at referral notes. Two types of patients moderated this relationship. The first are the enlightened or literate patients who expressed their preferences and engaged the doctor with questions. The second are the un-enlightened or illiterate patients who were passive and un-engaging.

#### **8.3.3.1 Contributions to the EBM model by this study from the perspective of developing countries**

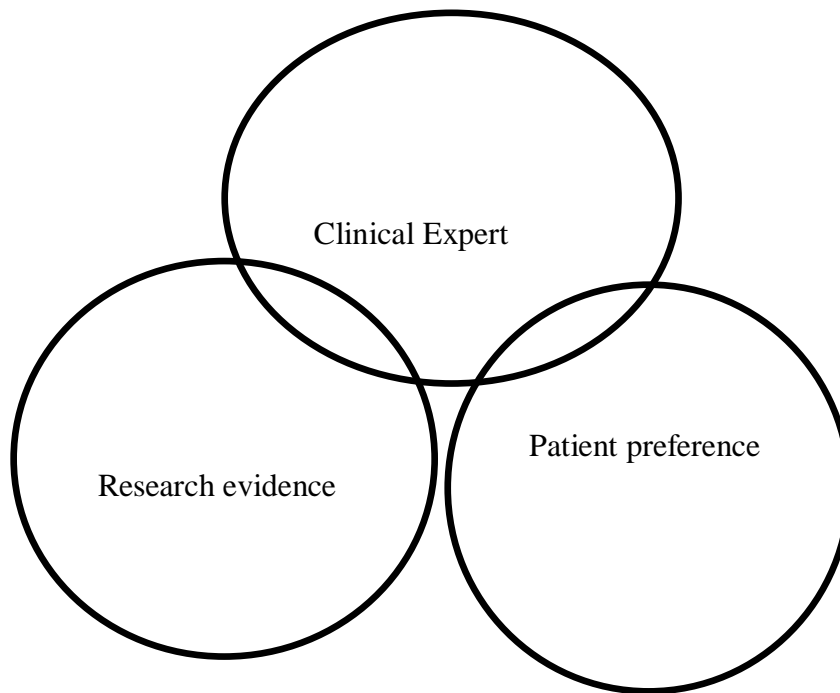
The following are the major contributions by this study to EBM modelling and the debate on its workability and applicability to developing countries:

- The patient values depend on the level of enlightenment of the patient.
- There are two types of patients, the enlightened (literate) and the unenlightened (illiterate) patient.
- The interaction of these two patients with the clinical expert and the clinical evidence differs and this puts to question the generalisation of the place of the patient in EBM and the graphic representation of the patient in the model. Figure 8.3 shows a graphic representation of how the unenlightened (illiterate) and passive patients barely interact

with the clinical expert and how they don't search for evidence on their own i.e. no interaction at all.

- Clinical expert in the developing countries like Malawi is at a disadvantage when dealing with the common tropical diseases because of lack of local EBM resources.
- Clinical expertise is not homogeneous and different doctors interact with illiterate and literate patients and evidence differently.
- The exploitation of evidence is dependent on accessibility of EBM resources at the point of care and on the information searching skills.
- The cellphone (smart phone) is an important tool for the implementation of EBM in resource poor countries as it enables solitary doctors to have access to specialists through the social web and to access open source EBM resources.
- The study has opened new debates on the extent to which EBM modelling could accommodate second best procedures (improvisation) that are followed due to lack of resources.

**Figure 8.3 The clinical expert, the clinical evidence and illiterate patient barely interacting**



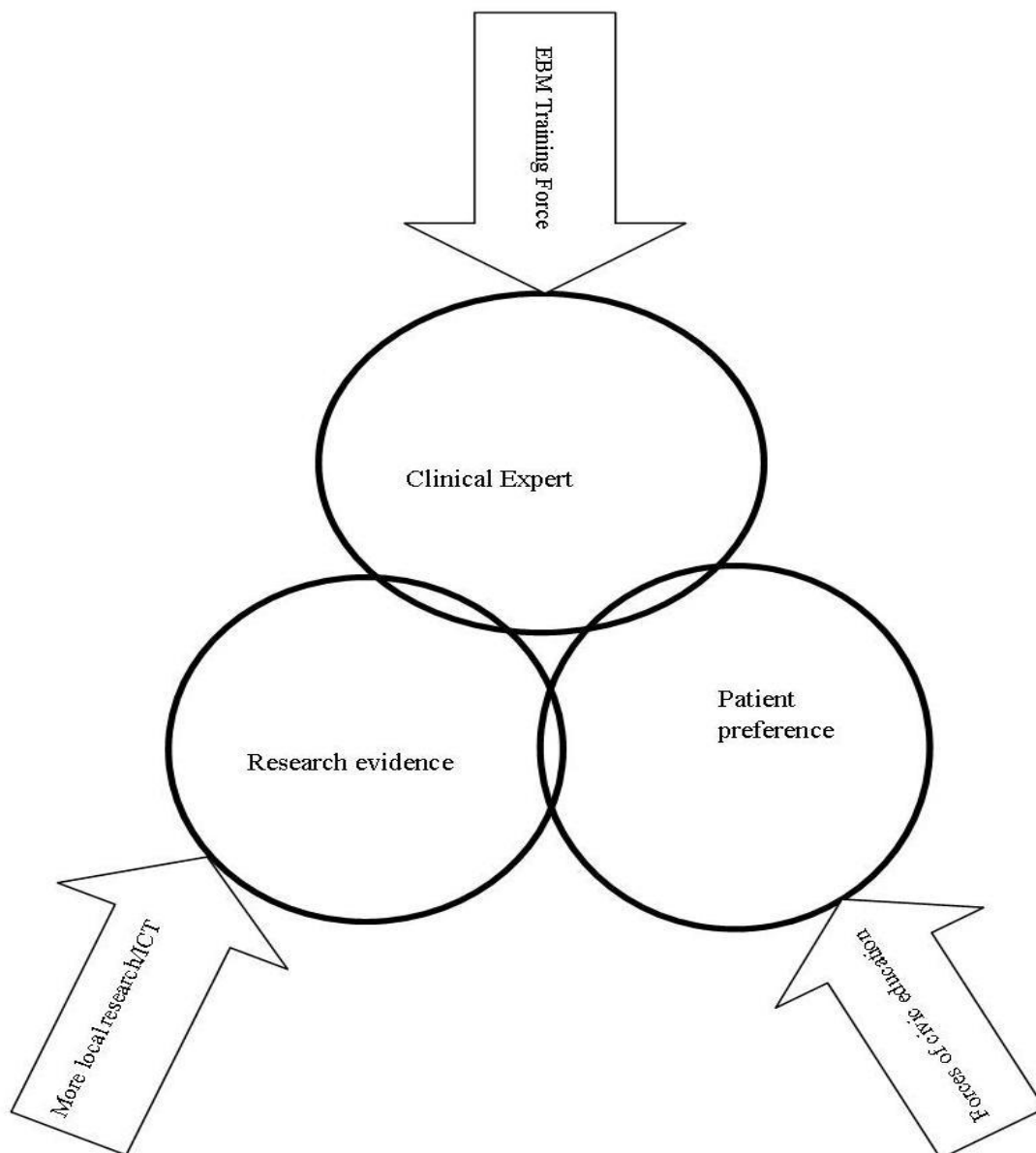
### **8.3.3.2 EBM interventions needed in developing countries such as Malawi**

This study established through its findings that for the EBM implementation in Malawi to be applied or practised to the level of the ideal suggested in the EBM model, there is need to bring in the following:

- Frequent EBM and information literacy (e.g. information searching) training is needed for the doctors in order to improve their exploitation of the clinical evidence.
- Given the high illiteracy rates, civic education on the citizens' health rights and their rightful role as stipulated by the EBM model is greatly needed. This civic education could include health information literacy and could easily be advocated by the health rights advocacy groups such as Malawi Health Equity N which was referred to in section 2.4.
- The generation of more relevant research results that are available to the hospitals through a functioning information infrastructure, would be the best 'intervention' that would push the clinical evidence towards the clinical expert and the patient preferences. This study further argues that the clinical evidence would have to be unpacked in some instances in the vernacular to make it more comprehensible for the

local patients. This study observed that in a way this is done in Malawi more especially for treatment guidelines through the Malawi Ministry of Health information, education and communication tools (IEC). Figure 8.4 below shows the three EBM circles and the proposed activating mechanisms that would push them towards each other for effective EBM services.

**Figure 8.4 The interventions on the adapted three EBM Vanguard Circles in Malawi**



#### **8.4 CONCLUSION**

This chapter interpreted the results on the information seeking behaviour of doctors in Malawi, and triangulated findings from quantitative and qualitative data, as well as the literature. Based on the interpretation, the chapter revisited the applicability of Wilson's 1996 model of information behaviour (revised in 1997 and 1999) within the Malawi context, before adapting the model in alliance with the EBM model. The chapter also discussed the implications of the study results on EBM steps and EBM modelling and what bearing these have on the clinical context of Malawian doctors before proposing some changes to the EBM model for consideration in Malawi.

## **CHAPTER 9. SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION**

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### **9.1 INTRODUCTION**

This chapter gives a summary of the study's research question and sub-questions, and shows how the objectives were met. It also gives a summary of the research design and the major findings on the research question and sub-questions, before briefly summarising what was covered in each chapter, and reflecting on the study's limitations. Recommendations for practice, theory, and healthcare policy in Malawi, as well as further research is offered before ending the chapter with a brief conclusion.

### **9.2 RESEARCH QUESTIONS AND SUB-QUESTIONS**

On the basis of the research problem, the study was guided by the following research question:

*How can doctors in Malawi adequately cultivate information seeking behaviour that is motivated by the EBM paradigm and that seeks to improve health service delivery and patient care in the midst of these local challenges?*

In order to address the research question, the study paid attention to the following sub-questions:

- How do doctors in Malawi define their information needs?
- What are the information seeking preferences of doctors in Malawi?
- What are the information sources that doctors in Malawi consult?
- What are the self-rated information searching skills of doctors in Malawi?
- To what extent do doctors in Malawi use the information they source to inform their decision making process as a way of implementing EBM?
- How can an understanding of the information seeking behaviour of doctors in Malawi inform EBM practices?

### **9.3 MEETING STUDY PURPOSE AND OBJECTIVES**

The purpose of this study was to deepen understanding of information behaviour practices if approached from an EBM paradigm and to make recommendations on cultivating information seeking behaviour inspired by an EBM paradigm.

The broad objective of this study was then set to determine the nature of information behaviour practices of doctors in Malawi, and factors that have an impact on their



information behaviour practices and their approaches to EBM. The broad objective was further broken into six specific objectives which are listed in section 9.2 as sub-questions and are summarised in Table 9.1. Table 9.1 also shows how the study met each of these objectives:

**Table 9.1 How the study met each specific objective**

<b>SPECIFIC OBJECTIVE</b>	<b>MEETING WITH EACH OBJECTIVE</b>
To explore how doctors in Malawi define their information needs during problem definition.	The objective was fully addressed and the study can report findings on the stages of defining information needs as well as the activating mechanisms i.e. factors that motivate or induce the doctors to define their information needs when making clinical decisions.
To investigate the information seeking preferences and information seeking behaviour of doctors.	The objective was fully addressed and the study can report findings on the preference for human resources as well as the critical role of mobile phones in assisting lone doctors in rural areas as they reach out to human sources or surf the Internet for open access medical databases.
To analyse the nature of the information sources that doctors in Malawi consult.	The objective was fully addressed and the study can report findings on use of information sources that are physically accessible other than those that are intellectually accessible i.e. what they would have preferred were all factors constant.
To determine the levels of their information search skills based on how they self-rated their skills.	The objective was fully addressed and the study can report findings on how doctors with information search skills were able to exploit open access medical databases on their mobile phones. Despite this success story, there were also doctors who indicated that they still did not have any search skills even after leaving College of Medicine.
To analyse the extent to which doctors in Malawi use acquired information to inform their decisions as a way of implementing EBM in a manner that improves the health delivery services.	The objective was fully addressed and the study can report on findings that more doctors in Malawi generally have good attitudes towards EBM and how their quest for information related to their desire to improve patient care.
To explore how an understanding of information behaviour practices can inform EBM practices.	The objective was fully addressed and the study can report on the use of appropriate frameworks for studying information behaviour practices from an EBM perspective as well as using understanding of doctors' information behaviour practices to

	make recommendations on cultivating information seeking behaviour supportive of EBM practices.
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#### 9.4 SUMMARY OF RESEARCH DESIGN

The research design of this study is summarised in Table 9.2 below:

**Table 9.2 Summary of the study's research design**

<b>Study title</b>	Information behaviour of doctors in Malawi: An evidence-based medicine perspective
<b>Research question</b>	How can an understanding of the information behaviour of doctors in Malawi be used to cultivate information behaviour practices required in an EBM paradigm that seeks to improve health service delivery and patient care in the midst of local challenges?
<b>Specific objectives of the study</b>	<ol style="list-style-type: none"> <li>1) To explore how doctors in Malawi define their information needs during problem definition.</li> <li>2) To investigate the information seeking preferences and information seeking behaviour of doctors.</li> <li>3) To determine the self-rating of information search skills by doctors.</li> <li>4) To analyse the nature of the information sources that doctors in Malawi consult.</li> <li>5) To analyse the extent to which doctors in Malawi use acquired information to inform their decisions as a way of implementing EBM in a manner that improves the health delivery services.</li> <li>6) To explore how an understanding of information behaviour practices can inform EBM practices.</li> </ol>
<b>Research paradigm</b>	A pragmatic research paradigm.
<b>Research approach</b>	A mixed method approach using a convergent design (Creswell, 2014) was employed where quantitative and qualitative methods were combined. Most of the responses to the questionnaire were analysed using SPSS. The responses from the semi-structured key informant interviews schedule were analysed using thematic analysis.
<b>Research methods</b>	Quantitative survey and qualitative key informant interviews.
<b>Data collection instruments</b>	Self-administered questionnaire for the quantitative survey (see Appendix 1). Semi-structured key informant interview schedule for qualitative component (see Appendix 2).
<b>Literature review</b>	<ul style="list-style-type: none"> <li>• Initial decisions that shaped discussions on data collection: February 2010 – December 2014</li> <li>• Updating initial literature review by monitoring the subject literature: January 2015 to October 2017.</li> </ul>
<b>Data collection</b>	August 2015 to November 2015.
<b>Study sites and participants</b>	The data were collected from 8 major hospitals in Malawi which account for almost two-thirds of all doctors (i.e. 400 of 600) in Malawi. The hospitals were: Kamuzu Central Hospital in the Central of Malawi, Queen Elizabeth Central Hospital, Zomba Central Hospital, Chiradzulu District Hospital, Thyolo District

	<p>Hospital, Mlambe Private Hospital, St Joseph Private Hospital, Blantyre Adventist Private Hospital and Mwaiwathu Private Hospital all from the Southern Malawi.</p> <p>Participants were divided into four categories i.e. interns, registrars, residents and specialists/consultants.</p> <ul style="list-style-type: none"> <li>• A total of 200 doctors were targeted for the quantitative survey and 173 returned the questionnaire.</li> <li>• Twenty doctors were targeted for the qualitative key informant interviews. All participated.</li> </ul>
<b>Data collection</b>	<p>Questionnaires were administered to the doctors in person and this was met with three responses which were; doctors filling in their questionnaire and giving it back, doctors requesting the questionnaire be collected later and some requesting that this researcher read out the questions and record while they gave the responses. A good percentage of those who said come back later account for those who never responded at all as they kept postponing. As for the key informant interview, this was done in person although there were some who preferred to be interviewed over the phone and through Skype.</p>
<b>Study ethics clearance</b>	<p>The study complied with the ethical requirements of the University of Pretoria's Faculty of Engineering and Built Environment (EBIT) from which permission to collect data from participants was requested and obtained before proceeding with data collection in June 2015.</p> <p>This research study also complied with all the ethical considerations of University of Malawi's College of Medicine Research and Ethics Committee (COMREC) which approves all medical/health research done in Malawi and approval letter was granted in August 2015.</p> <p>Letters of permission to collect data were also obtained from all the hospitals where the research was to be conducted and these have been included in the appendix of the thesis. (See Appendix 5).</p> <p>All participants signed a form of informed consent (see Appendix 3).</p>
<b>Data confidentiality</b>	<p>The participants of this study were assured of the confidentiality of the data that was going to be collected and how it was going to be used for this study only. The participant consent form that the participants signed before handed the self-administered questionnaire and before the qualitative key informant interview clearly addressed issues of confidentiality.</p>
<b>Validity and reliability of survey instruments</b>	<p>The questionnaire and the schedule for the interview drafts were given to two medical specialists for their review to establish whether the questions were comprehensible enough. The questionnaire draft was further reviewed by two senior lecturers in Statistics to ensure that it met with requirements. The questions for the questionnaire and the interview schedule were developed in a manner that responded to the key variables of the study established through the literature review.</p>
<b>Analysis</b>	<p>Descriptive statistical data analysis was carried out using SPSS with the assistance and advice of the statisticians at the Department of Mathematical Sciences at Chancellor College of the University of Malawi and a Senior Statistician from the Faculty of Public Health and Family Medicine at College of Medicine of the University of Malawi.</p> <p>Thematic analysis was applied for qualitative data.</p>

## **9.5 MAJOR FINDINGS**

The major findings of this study are presented according to the research sub-questions (see Section 9.2).

### **9.5.1 Identification of information needs**

The major finding here is that the identification of information needs was influenced by the doctors' uncertainty in both diagnosis and treatment which creates a desire to fill an information gap. Other factors identified were as follows: desire for quality healthcare, desire for self-efficacy, need to provide information to patients, need to improvise, need to understand English as a language by doctors whose first or even second language is not English (this was raised by expatriates from non-English speaking countries), need to be ethically and legally correct, need to prepare for disasters, and they need to choose the best option between two good choices. The study also found that the need to prepare for classes by both clinical lecturers and clinical students, the desire for professional development and the need to comply with EBM practice also influence information needs of doctors.

### **9.5.2 Information seeking preferences and information seeking behaviour of doctors**

The broad picture emerging from the study is that the majority of the doctors preferred to reach out to colleagues who are experts in the areas that challenge them. They also search for information on the Internet and they use print sources of information such as textbooks and journals. The following information seeking barriers are salient from the responses of the interviewed doctors: workload, overworking, lack of time, very slow Internet or no Internet at all, lack of search skills and out-dated books. These cause doctors to utilise electronic resources less often than would have been the case if they had time, a working Internet and good search skills.

### **9.5.3 Nature of information sources preferred by doctors**

Human, electronic and print sources are used. Human resources are preferred because people can be contacted electronically or in person. This is followed by electronic sources and print sources. An explanation for the preference for human sources is the lack of search skills, poor Internet, and an absence of working libraries respectively. This study established there were many doctors who indicated that they had the skills to search electronic resources but were limited from using these skills due to lack of resources in the hospitals they worked. It is however understandable that the human sources were the most popular because the sample

population had more junior doctors than senior doctors and they had to consult the specialists they report to whenever they face challenges.

#### **9.5.4 Information searching skills of doctors**

The study found that the majority of the doctors believed that their information searching skills were very good. When the doctors were asked in the questionnaire to self-rate the extent to which they were familiar with some popular databases they rated good skills for HINARI database which is sponsored by the WHO and the open source databases. The majority, however, rated their knowledge of the commercialised databases as very low. The explanation for this was that they were working in institutions that could not afford to pay for the licenses for access to the commercialised resources. It should also be noted that although HINARI database is a commercial database, it is accessed in health institutions in Malawi through WHO. There is evidence that people without proper search skills do not benefit much even if their institution gives them access to HINARI.

#### **9.5.5 Information use and EBM implementation of doctors**

The results showed that most doctors were influenced by EBM in their information use. Those who were trained in EBM were those more likely to apply EBM principles in their practice, and those who were not trained in EBM were more likely not to apply EBM principles in their practice.

#### **9.5.6 Doctors' perceptions of the value of understanding information behaviour practices to inform EBM practices and improvement of health delivery**

This study showed that the information behaviour practices of the doctors directly bear on the doctors' capability to search and analyse within the EBM context. The results showed that 61.8% of the doctors strongly agreed and 33.5% of the doctors agreed with the statement that 'the understanding of the information behaviour practices of the doctors can inform EBM practices in Malawi and thereby improve the health delivery'. Thus those who strongly agreed and those who agreed formed a great majority of 95.3% (i.e. 61.8% plus 33.5%). Apart from collecting information on doctors' perceptions of the value of understanding information behaviour practices in nurturing an EBM culture, the purpose of this study was to make recommendations on how such an understanding can contribute.

### **9.6 RECOMMENDATIONS FOR THEORY**

The following recommendations are made for theory:

- Testing of the EBM information behaviour model and specifically with regard to healthcare practices in developing countries.
- Exploring the impact of heterogeneity in the use of patients as information sources in an EBM model (Figures 3.1 and 3.2) for healthcare service, especially in developing countries.
- Appropriate utilisation of questioning techniques for exploring patients as information sources with acknowledgement of the difficulties noted in information behaviour literature on determining information needs and gaps in knowledge (e.g. the work of Taylor [1968] and Shenton [2008], as well as the problems noted in healthcare literature on collecting information from patients e.g. the work of Belsecker [2009] and Street and Millay [2009]).
- Aligning a deeper understanding of patient information behaviour with an EBM information behaviour model based on theories of the digital divide.
- Suitability of open access medical literature to African countries if seen from the perspective of a western healthcare approach versus an African healthcare approach.
- Scope, coverage and ease to identify/find open access medical content related to diseases of importance to a specific country e.g. tropical diseases that are of importance to Malawi.

## **9.7 RECOMMENDATIONS FOR PRACTICE**

The study also makes recommendations for medical/healthcare practice besides making recommendations specifically for the information behaviour practices of medical professionals and also for information behaviour practices in general in Malawi and these are outlined in sections 9.7.1 and 9.7.2 below.

### **9.7.1 Recommendations for medical/healthcare practice in Malawi**

Based on the study findings the following recommendations are made with regard to medical practice in Malawi:

- Officially investigating the value of EBM for the specific Malawian context from the macro level of government policy.
- Teaching of EBM and information seeking to all medical students.
- Monitoring the use of up-to-date treatment protocols and guidelines such as the Malawi Standard Treatment Guidelines (MSTG).

- Improving the health budget for hospitals in Malawi with a view to promote accessibility to EBM resources for health promotion.

### **9.7.2 Recommendations for practice of health professionals and information behaviour**

Based on the study findings the following recommendations are made with regard to health professionals and information seeking behaviour:

- Mandatory training in EBM and information literacy for all medical students.
- Improving information infrastructure that facilitates the use of mobile internet services for all doctors including those in remote or rural areas.
- Hospitals should shift away from the practice of building computer labs to the promotion of wireless access to the Internet through promotion of WiFi hotspots, tablets, smart phones and other ICT technologies for use by doctors.
- Investigation of ease of access and password control to healthcare and medical databases available for free via organisations such as the WHO.
- Improvement of the national health budget with a view to improve the information infrastructure of hospitals.
- Investigation of the improvement of hospital library infrastructures and staff profiles.

### **9.8 RECOMMENDATIONS FOR POLICY**

The following recommendations are made for medical policy development in Malawi:

- Enforcing and supporting the EBM policy in Malawian hospitals.
- Enhancing the circulation policy of new editions of Malawi Standard Treatment Guidelines (MSTG) so as to make sure that new editions reach all doctors at the same time.
- Extending the national health information policy to include conducting information literacy classes for hospital staff with the idea of improving the exploitation of WHO sponsored medical databases such as HINARI and other EBM databases.
- Investigation of ease of access and password control to healthcare and medical databases available for free via organisations such as the WHO.
- Increasing budgets to all referral and district hospitals with an aim of improving information infrastructures that support EBM implementation.
- Investigation of the improvement of hospital library infrastructures and staff profiles.

- Extending the health information policy to include promotion of state of the art libraries, widening access to WHO sponsored health databases, promoting use of open access peer reviewed resources, building databases for local medical evidence.
- Introducing EBM training to all medical interns with the idea to make EBM training a pre-requisite for membership of the Medical Council of Malawi.

## **9.9 RECOMMENDATIONS FOR FURTHER RESEARCH**

Recommendations for further research are made specifically with regard to Malawi as well as developing countries in general.

There are a number of things that future research in the area of information behaviour in Malawi could consider and these are:

- Firstly, future research could consider studying how doctors from various levels and contexts can explore social capital in following an EBM approach.
- Secondly, as the mobile networks keep being upgraded, a study in future could consider exploring whether the upgrades (e.g. from 3G network to 4G network) could correlate to changes in information behaviour practices of doctors.
- Use of mobile technology and internet searching by doctors in Malawi.
- Role of mobile service providers in supporting EBM healthcare practices in developing countries.
- Information infrastructures that can support EBM practices in developing countries.
- EBM related information literacy training for doctors in Malawi (and other developing countries).
- Health communication and education awareness activities for patients that can enlighten them about their expected roles within the EBM paradigm in a developing country such as Malawi.

## **9.10 CONCLUSION**

This chapter presented a summary of the study's research question and sub-questions, and demonstrated the extent to which the study purpose and objectives were met. It also presented a summary of the research design and the major findings on the research question and sub-questions. The chapter went further to summarise what was covered in each chapter and how the findings related to what was presented in the chapter. The chapter also came with recommendations for theory, practice and healthcare policy in Malawi. Finally the chapter



suggested areas for further research. The overall findings enabled this study to populate Wilson's model to present information behaviour of doctors in a medical context in a developing country. The findings also helped this study to adapt the original Vanguard Circles Model (Figure 8.4) to indicate the local forces that need to be met in a developing country in order to make the EBM paradigm work. Finally the study findings showed the correlation between information behaviour of doctors and EBM paradigm in the sense that doctors need good information behaviour practices in order to be effective in searching for and evaluating the clinical evidence.

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<sup>17</sup> The spelling of 'precepting' has been used here similar to the way it appears in the original article.

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## APPENDICES

### APPENDIX 1: INSTRUMENT FOR PREDOMINANTLY QUANTITATIVE DATA COLLECTION

#### QUESTIONNAIRE ON INFORMATION BEHAVIOUR OF DOCTORS

Dear Potential Participant

My name is Diston Chiweza and I am a doctoral student in the Department of Information Science at the University of Pretoria in the Republic of South Africa. The title of my study is **“The information behaviour of doctors in Malawi”**. In order to successfully complete this study, I have to conduct an empirical survey with doctors in Malawi and I am humbly inviting you to participate by responding to this questionnaire which takes about 20 minutes. The questionnaire focuses on your information behaviour and related elements such as: definition of clinical information needs, information seeking/searching preferences, clinical information sources and clinical information use and its relationship with evidence-based medicine (EBM) practices. The confidentiality of all interviewees will be protected and their names and their institutions will not be publicised. Please feel free to sign the accompanying consent form.

Your participation in this study is absolutely voluntary. If you feel uncomfortable to answer any of the questions, please feel free to skip them. The information you provide will be treated with the utmost confidentiality. I am willing to answer any questions that you may have regarding this study. My contact details are:

Mr. Diston Chiweza, The College Librarian, College of Medicine, University of Malawi, Private Bag 360, Chichiri, Blantyre 3. Malawi. Email: [Distonc@yahoo.co.uk](mailto:Distonc@yahoo.co.uk) or [DChiweza@medcol.mw](mailto:DChiweza@medcol.mw). Mobile Phones: +265881450393 and +265993911096.

Contact detail of my supervisor: Professor Ina Fourie (Department of Information Science; University of Pretoria). Tel.: +27 12 420-5216; Email: [ina.fourie@up.ac.za](mailto:ina.fourie@up.ac.za)

I thank you in advance for taking time to participate in the survey.



Diston Chiweza

4 May 2015

Question numbers	QUESTIONS	CODE	Tick the appropriate	
<b>SECTION A: BACKGROUND INFORMATION</b>				
<b>1</b>	<b>What is your highest qualification?</b>			
	a) Bachelor of Medicine and Bachelor of Surgery or Doctor of Medicine	1		
	b) Master's degree	2		
	c) Doctorate degree	3		
	If other, specify:			
<b>2</b>	<b>Where did you do your medical training?</b>			
	a) In Malawi	1		
	b) In another developing country in Africa	2		
	c) In another developing country outside Africa	3		
	d) In a developed country	4		
<b>3</b>	<b>To how many hospitals are you rendering your clinical services</b>			
	a) One hospital	1		
	b) Two hospitals	2		
	c) Three hospitals	3		
	d) Four hospitals	4		
	e) More than four hospitals	5		
<b>4</b>	<b>What is your current professional category at the hospital(s) where you work?</b>			
	a) Intern	1		
	b) Registrar	2		
	c) Resident	3		
	d) Specialist	4		
If other, specify				
<b>5</b>	<b>Where do you fulfil most of your duties? (Please tick the appropriate option for each of the following: main hospital refers to the hospital where you are primarily employed)</b>			
	a) Clinical duties at the main hospital	0%	1	
		Less than 25%	2	
		26-50%	3	
		51-75%	4	
		76-100%	5	
	b) Administrative duties at main hospital	0%	1	
		Less than 25%	2	
		26-50%	3	
		51-75%	4	

		76-100%	5	
	c) Clinical duties outside main hospital	0%	1	
		Less than 25%	2	
		26-50%	3	
		51-75%	4	
		76-100%	5	
	d) Administrative duties outside main hospital	0%	1	
		Less than 25%	2	
		26-50%	3	
		51-75%	4	
		76-100%	5	
	e) Research	0%	1	
		Less than 25%	2	
		26-50%	3	
		51-75%	4	
		76-100%	5	
	f) Teaching	0%	1	
		Less than 25%	2	
		26-50%	3	
		51-75%	4	
		76-100%	5	
If other, specify and indicate the percentage of time _____				
<b>6</b>	<b>How many days per week do you see patients</b>			
	a) For a full day?	1 day per week	1	
		Two days per week	2	
		Three days per week	3	
		Four days per week	4	
		Five days per week	5	
		Six days per week	6	
		Seven days per week	7	
	b) For half a day or less?	1 day per week	1	
		Two days per week	2	
		Three days per week	3	
		Four days per week	4	
		Five days per week	5	
		Six days per week	6	
		Seven days per week	7	
<b>7</b>	<b>On your busiest day, what is on estimation the highest number of patients that you see?</b> _____			
<b>8</b>	<b>In which type of hospital are you primarily employed?</b>			

	a) Government hospital/health centre – Urban	1	
	b) Government hospital/health centre – Rural	2	
	c) Private hospital – Urban	3	
	d) Private hospital – Rural	4	
	e) CHAM hospital – Urban	5	
	f) CHAM hospital– Rural	6	
	If other, please specify _____		
<b>SECTION B: EVIDENCE-BASED MEDICINE (EBM)</b>			
<b>9</b>	<b>Please indicate your awareness of evidence-based medicine (EBM) and whether you apply evidence-based medicine (EBM) practice by marking the most appropriate options.</b>		
	a) Heard about EBM	Yes	1
		No	2
	b) Trained in EBM	Yes	1
		No	2
	c) Apply EBM	Yes	1
		No	2
<b>10</b>	<b>Evidence-based medicine is said to be a health delivery approach that has the potential to improve the health delivery system of developing countries like Malawi. Please rate your opinion on this statement by ticking the most appropriate opinion.</b>		
	a) Strongly disagree	1	
	b) Disagree	2	
	c) Agree	3	
	d) Strongly agree	4	
	Will you briefly explain your answer? _____ _____ _____		
<b>11</b>	<b>Will you please rate the extent to which the following are barriers to your application of evidence-based medicine (EBM) in your clinical duties?</b>		
	a) Poor EBM knowledge	No problem	1
		Somewhat	2
		Significant	3
		Prevents application of EBM	4
	b) Lack of information resources	No problem	1
		Somewhat	2
		Significant	3
		Prevents application of EBM	4
	c) Lack of training in	No problem	1

	information searching	Somewhat	2	
		Significant	3	
		Prevents application of EBM	4	
	d) Lack of time	No problem	1	
		Somewhat	2	
		Significant	3	
		Prevents application of EBM	4	
	If other, please specify: _____			
<b>SECTION C: INFORMATION BEHAVIOUR AND EVIDENCE-BASED MEDICINE</b>				
<b>12</b>	<b>Please rate your skills in applying the five main steps of evidence-based medicine (EBM) by ticking the appropriate option for each of the steps below:</b>			
	a) Framing questions	Very good	1	
		Good	2	
		Mediocre	3	
		Poor	4	
	b) Identifying literature	Very good	1	
		Good	2	
		Mediocre	3	
		Poor	4	
	c) Assessing the quality of information	Very good	1	
		Good	2	
		Mediocre	3	
		Poor	4	
	d) Summarising the evidence gathered	Very good	1	
		Good	2	
		Mediocre	3	
		Poor	4	
	e) Interpreting the findings so as to inform the clinical decisions	Very good	1	
		Good	2	
		Mediocre	3	
		Poor	4	
<b>13</b>	<b>Does evidence-based medicine (EBM) form part of the operational policy of the hospital where you have your main employment?</b>			
	a) Yes			
	b) No			

14	<b>If your answer to question 13 is yes, to what extent does the hospital operating policy on evidence-based medicine (EBM) stimulate your need for information and willingness to look for information?</b>		
	a) Need for information	Strongly	1
		Somewhat	2
		No impact	3
	f) Willingness to look for information	Strongly	1
		Somewhat	2
No impact		3	
15	<b>To what extent do you agree with the following statement: “Understanding of Malawian doctors’ ability to seek and use information has the potential to inform evidence-based medicine (EBM) practices that can improve health delivery services in Malawi”</b>		
	a) Strongly agree		1
	b) Agree		2
	c) Disagree		3
	d) Strongly disagree		4
<b>SECTION D: INFORMATION SEEKING</b>			
16	<b>To what extent do you experience the following barriers when seeking information for your clinical duties? (Tick the most appropriate option for each barrier).</b>		
	a) Work load	Not a barrier	1
		Minor barrier	2
		Moderate barrier	3
		Major barrier	4
	b) Identifying appropriate search terms	Not a barrier	1
		Minor barrier	2
		Moderate barrier	3
		Major barrier	4
	c) Lack of awareness of information sources	Not a barrier	1
		Minor barrier	2
		Moderate barrier	3
		Major barrier	4
	d) Assessing the quality of information	Not a barrier	1
		Minor barrier	2
		Moderate barrier	3
		Major barrier	4
	e) Lack of access to the Internet	Not a barrier	1
		Minor barrier	2
		Moderate barrier	3
		Major barrier	4
	f) Lack of access to other	Not a barrier	1

	information resources	Minor barrier	2	
		Moderate barrier	3	
		Major barrier	4	
	g) Complexity of interpreting the gathered evidence into clinical decision	Not a barrier	1	
		Minor barrier	2	
		Moderate barrier	3	
		Major barrier	4	
	h) Lack of training in information retrieval	Not a barrier	1	
		Minor barrier	2	
		Moderate barrier	3	
		Major barrier	4	
	i) Lack of training in evidence-based medicine	Not a barrier	1	
		Minor barrier	2	
		Moderate barrier	3	
		Major barrier	4	
	j) Lack of experience in evidence-based medicine	Not a barrier	1	
		Minor barrier	2	
Moderate barrier		3		
Major barrier		4		
Other, please specify: _____				
<b>17</b>	<b>Please indicate how frequently you use the following sources of information by selecting the most appropriate option for each source.</b>			
a) Specialists senior to you	Daily	1		
	Several times a week	2		
	Once a week	3		
	Once or twice a month	4		
	Never	5		
b) Printed books	Daily	1		
	Several times a week	2		
	Once a week	3		
	Once or twice a month	4		
	Never	5		
c) Ebooks	Daily	1		
	Several times a week	2		
	Once a week	3		
	Once or twice a month	4		
	Never	5		
	Daily	1		
d) Printed journals	Daily	1		
	Several times a week	2		
	Once a week	3		



		Once or twice a month	4	
		Never	5	
		Daily	1	
	e) Journals	Daily	1	
		Several times a week	2	
		Once a week	3	
		Once or twice a month	4	
		Never	5	
		Daily	1	
	f) Medical databases e.g. UpToDate, Pubmed, Medline, etc.	Daily	1	
		Several times a week	2	
		Once a week	3	
		Once or twice a month	4	
		Never	5	
	g) Google scholar	Daily	1	
		Several times a week	2	
		Once a week	3	
		Once or twice a month	4	
		Never	5	
		Daily	1	
	h) Google or other search engines	Daily	1	
		Several times a week	2	
		Once a week	3	
		Once or twice a month	4	
		Never	5	
	Other, please specify: _____			

<b>18</b>	<b>Please indicate how you have in the past used the following sources of information by ticking the appropriate option against each source.</b>			
	a) Medline	Unaware	1	
		Aware but never used	2	
		Purposive to find information	3	
		Somebody used it on my behalf	4	
	b) EMBASE	Unaware	1	
		Aware but never used	2	
		Purposive to find information	3	
		Somebody used it on my behalf	4	
	c) Cochrane Library	Unaware	1	
		Aware but never used	2	
		Purposive to find information	3	
		Somebody used it on my behalf	4	

	d) HINARI	Unaware	1	
		Aware but never used	2	
		Purposive to find information	3	
		Somebody used it on my behalf	4	
	e) EBSCO	Unaware	1	
		Aware but never used	2	
		Purposive to find information	3	
		Somebody used it on my behalf	4	
	f) UpToDate	Unaware	1	
		Aware but never used	2	
		Purposive to find information	3	
		Somebody used it on my behalf	4	
	g) Google or other general search engines	Unaware	1	
		Aware but never used	2	
		Purposive to find information	3	
		Somebody used it on my behalf	4	
h) Google scholar	Unaware	1		
	Aware but never used	2		
	Purposive to find information	3		
	Somebody used it on my behalf	4		
i) If other, please specify_____				
<b>19</b>	<b>Please rate your skills in using databases (e.g. HINARI; EBSCO, PUBMED, etc.)</b>			
	a) Very good		1	
	b) Fair		2	
	c) Poor		3	
	d) Very poor		4	
<b>20</b>	<b>How often do you need information for the following reasons? Please tick the appropriate.</b>			
	a) Making clinical diagnosis	Never	1	
		Seldom	2	
		Often	3	
		Very often	4	
	b) Patient care	Never	1	
		Seldom	2	
		Often	3	
		Very Often	4	
	c) Patient treatment	Never	1	
		Seldom	2	
		Often	3	
		Very Often	4	
	d) Providing information to patients	Never	1	
		Seldom	2	

		Often	3
		Very Often	4
	e) Advising a colleague	Never	1
		Seldom	2
		Often	3
		Very Often	4
	e) Other facets of your clinical duties	Never	1
		Seldom	2
		Often	3
		Very Often	4
<b>THANK YOU VERY MUCH FOR YOUR PARTICIPATION IN THIS SURVEY.</b>			

**APPENDIX 2: INSTRUMENT FOR QUALITATIVE DATA COLLECTION**  
**INTERVIEW SCHEDULE FOR KEY INFORMANTS: INFORMATION**  
**BEHAVIOUR OF DOCTORS IN MALAWI**

**DOCTORS AND INFORMATION NEEDS**

I would like to know about your information needs for enhancing the clinical decisions you need to take in your job:

Apart from your own knowledge and experience that you have with your job, which extra information do you need to help you make clinical decisions?

What are the factors that cause you to look for extra information to help you with your clinical decisions?

**INFORMATION SEEKING**

I would like to know how you find information for clinical decision making:

How do you normally look for extra information?

Is it easy for you or are there some challenges?

**INFORMATION SOURCES**

I would like to learn about the information sources that you use to find information for clinical decision making:

There are many sources of information such as human sources (specialists or peers), printed books and journals, electronic books and journals. Which services do you prefer and why?

Are there any Malawi specific challenges for doctors with regard to medical information sources that could help them when making clinical decisions?

## **INFORMATION SHARING**

I would like to know how you generally share information related to your clinical work:

Are there information sharing channels at your hospital such as; meetings, workshops, membership of professional bodies?

How effective are they in helping you to improve your clinical decision-making?

## **EVIDENCE-BASED MEDICINE (EBM)**

I would now like to ask you a few questions about evidence-based medicine (EBM).

What is your understanding of EBM?

How do you feel about applying EBM in your clinical work?

Do you think EBM can make a difference to the clinical decision making of doctors?

How do you think your attitude to EBM influences how you *look* for information as a doctor working in Malawi?

How do you think your attitude to EBM influences how you *use* information in your clinical work as a doctor in Malawi?

## APPENDIX 3: INFORMED CONSENT FORM<sup>18</sup>

**Title of Research Project:** Information behaviour of doctors in Malawi.

**Principal Investigator:** Diston Chiweza, Department of Information Science, University of Pretoria, South Africa. (Malawi address: The Librarian, College of Medicine, University of Malawi, PB 360, Blantyre). **Phone Number:**+265 881450393 / 0993096911

### **Supervisor:**

Professor Ina Fourie, Department of Information Science, University of Pretoria, South Africa. Email: ina.fourie@up.ac.za

### **Sponsor:**

Currently, I am a self-sponsored doctoral student.

### **Introduction**

You are being asked to take part in a study which I am conducting as part of my doctoral degree with the University of Pretoria through administration of a quantitative questionnaire and/or a key informant interview. You were selected to participate in the study on *The Information behaviour of doctors in Blantyre and selected districts*.

This is a consent form which gives brief details about the study. I will explain to you about the study. You are free to ask questions at any time. You are also free to choose whether to participate in this research or not. However, if you refuse to take part in this study, I will not force you to join the study. Your refusal to accept will not affect your job in any way. You will be given a copy of this consent form to keep.

If some of the Information Science words I have used are too technical for your understanding, please feel free to ask me to clarify them.

### **What is the aim of the study?**

The aim of this study is to determine the nature of information behaviour of doctors in Blantyre and selected districts and how such behaviour can be supportive of Evidence-Based Medicine (EBM) practices.

### **What will happen if you decide to take part in this study?**

I will take you through the questionnaire and give you a chance to respond to each question. You are free to fill in the questionnaire yourself or you can just be talking while I write your answers down. At the end of the exercise we will go through the questionnaire together just to verify that the recorded answers are a true representation of your sentiments.

### **For how long will I take part in this study?**

---

<sup>18</sup>This form is hereby presented in the format of the College of Medicine Research and Ethics Committee (COMREC) of the University of Malawi which is the clearing body for all medical or related research activities in Malawi. COMREC subjects all researchers and students from outside Malawi to its format as long as they do research in Malawi.

The question time is not expected to exceed 20 minutes.

**What will be my benefit/compensation for taking part in this study?**

There is no benefit in you taking part in this study. However, the data collected from your participation will inform the medical fraternity in Malawi on how best the information behaviour of the doctor can be improved so as to enhance evidence-based medicine practice.

**What are the risks in this study?**

The risk of confidentiality is covered by the fact that the names of the participants and their institutions will not be published anywhere. All recordings will be done with your consent and the identity of the recorded voices will not be revealed or publicised.

**How will my information be kept confidential?**

Your consent form and the recorded data will be kept in a locked cabinet. Only members of the study team and the Ethics Committee will have access to this information. I will not use your name or anything that will identify you to others when reporting results of this study or in publications. Instead you will be identified by a number and the data that will be entered into a computer that is password-protected.

**Where will you keep results of this study and for how long will you keep them?**

Your consent forms and the recorded materials will be kept under lock and key in the Librarian's office at College of Medicine of the University of Malawi. Your data will be destroyed in accordance with the University of Pretoria Research and Ethics and the College of Medicine Research and Ethics requirements.

**Can I withdraw from the study before completion of the study?**

You are free to withdraw from the study at any time you may wish.

**What will my participation in this study cost me?**

There is no cost attached to participating in this study.

**If you have any questions about this study;**

You are free to ask questions to me personally and you can contact me on the above mentioned phone numbers or email me on [DChiweza@medcol.mw](mailto:DChiweza@medcol.mw)

**Whom do I ask if I have questions about my rights in this study?**

The study was approved by the College of Medicine Research and Ethics Committee (COMREC). The Committee safeguards the rights and safety of research participants. Should you have any questions or concerns about your rights, please, contact the COMREC secretariat on +265 1 871 911. This study has also been approved by the University of Pretoria Research Committee in the Faculty of Engineering, Built Environments and Information Technology.

**Consent to participate**

I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for the purposes of publication.

I agree to participate in this research and I append my signature below.

I further agree for the interview to be recorded: \_\_\_\_\_

I do not agree for the interview to be recorded: \_\_\_\_\_

Upon signature of this form, you will be provided with a copy.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

Researcher: \_\_\_\_\_ Date: \_\_\_\_\_

Interview site: \_\_\_\_\_

Interview date: \_\_\_\_\_

Time interview started: \_\_\_\_\_ Time interview ended: \_\_\_\_\_



#### APPENDIX 4: LIST OF KEY INFORMANTS FOR QUALITATIVE INTERVIEWS

DATE OF INTERVIEW	CODE	DESCRIPTION OF INTERVIEWEE	TYPE OF HOSPITAL
September 20, 2015	Doctor 1	Hospital Director	PVT <sup>19</sup> - rural
October 1, 2015	Doctor 2	Director clinical services	Govt <sup>20</sup> – urban
October 2, 2015	Doctor 3	Director clinical services	Govt – urban
October 3, 2015	Doctor 4	Medical officer	Govt–rural
October 3, 2015	Doctor 5	Hospital director	Govt–urban
October 3, 2015	Doctor 6	Chief medical officer	PVT –rural
October 3, 2015	Doctor 7	Medical officer	PVT –rural
October 3, 2015	Doctor 8	Hospital director	PVT – urban
October 11, 2015	Doctor 9	Surgical resident	Govt– urban
October 12, 2015	Doctor 10	Specialist in medicine	Govt - urban teacher
October 20, 2015	Doctor 11	Specialist in ophthalmology	Govt - urban teacher
October 20, 2015	Doctor 12	Medical officer	Govt- rural
October 20, 2015	Doctor 13	Specialist in medicine	Govt- rural
October 20, 2015	Doctor 14	Resident (O & G) <sup>21</sup>	Govt – urban
October 28, 2015	Doctor 15	Specialist in paediatrics	Govt - urban teacher
October 28, 2015	Doctor 16	Specialist in surgery	Govt - urban teacher
October 28, 2015	Doctor 17	Specialist (EM) <sup>22</sup>	Govt - urban teacher
October 30, 2015	Doctor 18	Resident (O & G)	Govt – urban
October 31, 2015	Doctor 19	Medical intern	Govt – urban
October 31, 2015	Doctor 20	Medical intern	Govt–urban

<sup>19</sup> PVT is Private hospital

<sup>20</sup> Govt is Government hospital

<sup>21</sup> O & G is Obstetrics and Gynaecology

<sup>22</sup> EM is Emergency Medicine

## APPENDIX 5: LETTERS OF PERMISSION TO DO RESEARCH



### MWAIWATHU Private Hospital Limited

Old Chileka Road, P.O Box 3067, Blantyre, Malawi  
Phone Numbers: +265 1 822 999/+265 1 834 989  
Fax: +265 1 821 190  
Email: [mdpa@mwaiwathuhospital.com](mailto:mdpa@mwaiwathuhospital.com)  
Website: <http://www.mwaiwathuhospital.org>

7<sup>th</sup> July 2015

Mr Diston Chiweza  
College of Medicine  
Private Bag 360  
Blantyre 3

Dear Mr Chiweza

**APPROVAL TO CONDUCT YOUR RESEARCH ENTITLED: THE INFORMATION BEHAVIOUR OF MEDICAL DOCTORS IN MALAWI**

We are writing in response to your letter of the 27<sup>th</sup> of June 2015 requesting approval and permission for you to conduct the above study at our hospital. We have gone through your research proposal and do hereby allow you to conduct the study here.

You will let us know when you plan to commence and complete your study so that we can alert the doctors appropriately.

We wish you the best with this study.

Yours sincerely

  
**J WIRIMA**  
Medical Director

---

Directors: S. Chikoti, M. Katsala, P. Mhango, E. Malton, T. Daniel, L. Sibande, J. Wirima

The Medical Director  
St Joseph's Hospital  
Blantyre  
29<sup>th</sup> June 2015

Mr Diston Chiweza  
College of Medicine  
Private Bag 360  
Blantyre, 3.

Dear Mr Chiweza,

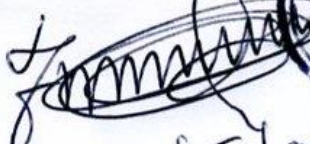
**NO OBJECTION TO YOUR RESEARCH**

My office is in receipt of your letter in which you are requesting for my permission to let you undertake your research on '**Information behaviour of medical doctors in Malawi**'. My office has no problems with your research and you are hereby permitted to go ahead and conduct it at our hospital.

I wish you all the best in your research and study.

Sincerely,

The Medical Director  
St Joseph's Hospital

  
Dr. Michel Tohachi



The Medical Director  
Mlambe Hospital  
Blantyre  
29<sup>th</sup> June 2015

Mr Diston Chiweza  
College of Medicine  
Private Bag 360  
Blantyre, 3.


Dear Mr Chiweza,

**NO OBJECTION TO YOUR RESEARCH**

My office is in receipt of your letter in which you are requesting for my permission to let you undertake your research on '**Information behaviour of medical doctors in Malawi**'. My office has no problems with your research and you are hereby permitted to go ahead and conduct it at our hospital.

I wish you all the best in your research and study.

Sincerely,

  
The Medical Director  
**Mlambe Hospital**

DOCTOR I/O  
GERMANA MUNABI

THE SENIOR MEDICAL OFFICER  
MLAMBE HOSPITAL  
P.O. BOX 45, LUNZU  
MALAWI



TELEPHONE NO: (265).1.753 555  
TELE FAX NO: (265).1.756380

PLEASE ADDRESS ALL COMMUNICATIONS TO:  
THE HOSPITAL DIRECTOR



MINISTRY OF HEALTH  
KAMUZU CENTRAL HOSPITAL  
P.O BOX 149  
LILONGWE  
MALAWI

REF/KCH/GA/0.01

30<sup>th</sup> June, 2015.

Diston Chiweza  
The College Librarian  
College of Medicine  
Private Bag 360  
Chichiri  
**BLANTYRE**

Dear Diston Chiweza,

**APPROVAL TO CONDUCT A NO OBJECTION DOCTORAL  
RESEARCH INTERVIEWS**

We are pleased to inform you that your request to conduct the above at Kamuzu Central Hospital has been approved.

Wishing you all the best in your research.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'Jonathan Ngoma'.

Dr Jonathan Ngoma  
**HOSPITAL DIRECTOR**

Telephone: (265) 01 874 333 /877 333  
Facsimile: (265) 01 876928  
Email: [queenshosp@globemw.net](mailto:queenshosp@globemw.net)



In reply please quote **No. QEC/GEN/2**

All communications should be addressed to:  
The Hospital Director

QUEEN ELIZABETH CENTRAL HOSPITAL  
P.O. BOX 95  
BLANTYRE  
MALAWI

**2<sup>nd</sup> July, 2015**

Mr Diston Chiweza  
College of Medicine  
Private Bag 360  
Chichiri  
**BLANTYRE 3**

Dear Student,

**RE: PERMISSION TO CONDUCT A RESEARCH STUDY AT QUEEN ELIZABETH  
CENTRAL HOSPITAL**

Reference is made to your letter dated 27<sup>th</sup> June, 2015 in which you requested to conduct research study entitled "**The information behavior of medical doctors in Malawi** ? "at Queen Elizabeth Central Hospital.

This letter serves to inform you that Management has no objection for you to conduct a research study in various medical departments.

Wishing you all the best in your studies.

Yours faithfully,

Dr Andrew Gonani  
**HOSPITAL DIRECTOR**



**Cc: HOD - MEDICINE**

Ref. No.: **ZCH/**  
Telephone No.: **01 526266/01525195**  
Telefax No.: **(265) 1 524 538**  
Telex No.:  
E-Mail: **medzch@malawi.net**



MINISTRY OF HEALTH  
ZOMBA CENTRAL HOSPITAL  
P.O BOX 21  
ZOMBA  
MALAWI

Please address all communications to:  
The Hospital Director

3<sup>rd</sup> July, 2015

MR. DISTON CHIWEZA,  
COLLEGE LIBRARIAN,  
MALAWI COLLEGE OF MEDICINE,  
PRIVATE BAG 360,  
**BLANTYRE.**

Dear Sir,

**NO OBJECTION APPROVAL FOR DOCTORAL RESEARCH**

Refer to your letter dated 27<sup>th</sup> June, 2015 in which you were requesting for approval to carry out a research titled "The Information behavior of Medical doctors in Malawi.

I wish to convey Hospital Directors approval for you to carry out the research at Zomba Central Hospital. It is our hope that you will abide by the code of ethics of the study.

Furthermore, the information obtained should be used for academic purposes only and that should you require to publish the information, further, authority is required from the Hospital Director.

Yours faithfully,

L. Thom Chisale

**CHIEF HOSPITAL ADMINISTRATOR**  
**For: THE HOSPITAL DIRECTOR**





Telephone: + 265 1 473 411

Facsimile: + 265 1 473 409



In reply please quote NoTDH/

**Ministry of Health,**

Thyolo District Hospital, 

P.O. Box 21,

Thyolo.

Malawi.

All Communications should be addressed to:

The District Health Officer:

**Mr Diston Chiweza**

Malawi College of Medicine,

P/Bag 360,

Blantyre 3.

Dear Sir,

**Letter of Approval to Conduct Research at Thyolo District Health office**

My office is in receipt of your letter in which you are requesting for permission to undertake your research on '**Information behaviour of Medical Doctors in Malawi**'.

We acknowledge that we have reviewed your study proposal and permission has been granted for you to conduct the study in Thyolo district.

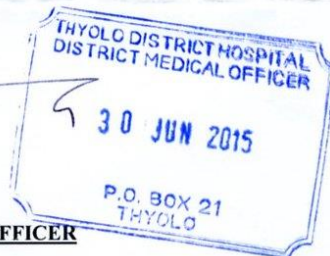
I wish you all the best in your research and study.

Sincerely,

A handwritten signature in black ink, appearing to be 'M. Murowa', written over a horizontal line.

Dr. Michael Murowa.

**DISTRICT HEALTH OFFICER**







## Blantyre Adventist Hospital

P.O. Box 51, BLANTYRE, MALAWI, AFRICA

FAX: (265) 01 823 29  
E-MAIL: bah.hosp@yahoo.co

The Medical Director  
Adventist Hospital  
Blantyre  
29<sup>th</sup> June 2015

Mr Diston Chiweza  
College of Medicine  
Private Bag 360  
Blantyre, 3.

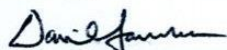
Dear Mr Chiweza.

### **NO OBJECTION TO YOUR RESEARCH**

My office is in receipt of your letter in which you are requesting for my permission to let you undertake your research on '**Information behaviour of medical doctors in Malawi**'. My office has no problems with your research and you are hereby permitted to go ahead and conduct it at our hospital.

I wish you all the best in your research and study.

Sincerely,

  
David Saunders, MD  
The Medical Director (Acting)  
**Adventist Hospital**

BLANTYRE ADVENTIST HOSPITAL  
P.O. BOX 51  
BLANTYRE