Information Behaviour of Medical Doctors and Professional Nurses in Selected Hospitals of OR Tambo Health District, Eastern Cape Province, South Africa

By

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DECLARATION

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ii) This thesis has not been submitted for any degree or examination at any other university.

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ABSTRACT

The purpose of this study was to investigate the information behaviour of medical doctors and professional nurses in five selected district hospitals of the OR Tambo Health District in the Eastern Cape Province of South Africa. The study addressed the following research questions: What role and tasks do medical doctors and professional nurses perform in the five selected hospitals? What are the information needs of medical doctors and professional nurses in the five selected district hospitals? What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals? What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals?

The study used Leckie, Pettigrew and Sylvain's 1996 information seeking model as the theoretical lens underpinned by a post-positivism paradigm and a mixed method approach. A descriptive exploratory design was conducted. The population of study consisted of medical doctors and professional nurses in the five district hospitals. District hospitals play a pivotal role in supporting primary health care and are also a gateway to more specialist care. Data was collected using in-depth interviews, non-respondent observation and a survey questionnaire. A total of 167 of 205 copies of the questionnaire were distributed to medical doctors and professional nurses in the district hospitals were completed and returned, giving a response rate of 81.5%. Professional nurses constituted 86.3% of the survey respondents whereas medical doctors constituted 13.8%. In addition, all targeted interview respondents who included; 5 clinical managers and 5 nursing service managers were interviewed, translating to 100% response rate. All hospital wards except theatres were covered through observation. The quantitative data was analysed using SPSS while qualitative data was analysed thematically.

The findings revealed that roles and associated tasks of medical doctors and professional nurses in the five selected district hospitals for which they needed information included

patient care, teaching, training, continuing professional development and research. Medical doctors and professional nurses in the district hospitals surveyed preferred clinical guidelines, colleagues, hospital procedure manuals, drug lists, and reference books as sources of information. The findings revealed that ward rounds, workshops, seminars and in-service training were other preferred sources of information by medical doctors and professional nurses. The findings showed that the characteristics of the information source such as accessibility, familiarity, trustworthiness and cost and personal attributes such as willingness to learn, exposure to information during undergraduate training, peer pressure, and youthful age motivated medical doctors and professional nurses to look for information. The lack of time, unavailability of computers, lack of internet connectivity, inadequacy, or unavailability of libraries, and lack of technological skills were found to hinder access to information sources.

The study makes among other recommendations: the need for institutional and national policies for the provision of information services to medical doctors and nurses; regular information behaviour surveys; making documents available in electronic formats; requisite implementing capacity building programmes for medical nurses and doctors; and providing information access points close to or within reasonable distance to the work place of medical doctors and professional nurses.

The study makes original contribution to the domain of information behaviour of medical doctors and nurses from a developing country context such as South Africa. The study also forms the basis upon which policies related to the provision of information for medical doctors and professional nurses in public hospitals in the South African context can be formulated. The study provides baseline information upon which more research can be undertaken on the information needs, preferred information sources as well as factors that facilitate or hinder information seeking behaviour of medical doctors and professional nurses in South Africa. Future research should be extended to cover information behaviour of medical doctors, medical specialists, and nurses in tertiary, regional, and specialised hospitals in South Africa.

DEDICATION

This thesis is dedicated to my husband, Dr. Wezile Chitha for his resolute support and endless love.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
AIDS	Acquired Immunodeficiency Syndrome
CEO	Chief Executive Officer
CPD	Continuous Professional Development
DENOSA	Democratic Nursing Organisation of South Africa
EBM	Evidence Based Medicine
EBML	Evidence Based Medical Librarianship
HIFA	Health Information For All
HIV	Human Immunodeficiency Virus
ICU	Intensive Care Unit
ICT	Information and Communication Technology
ISP	Information Search Process
JCAHO	Joint Commission on Accreditation of Health Organisations
LISA	Library and Information Abstract
MDR	Multi Drug Resistant
NHI	National Health Insurance
OPD	Outpatient ward
NSM	Nursing Service Manager
PN	Professional Nurse
SABINET	South African Bibliographic network

SICU	Surgical Intensive Care Unit
SPSS	Statistical Package for Social Sciences, version 19 SPSS
TB	Tuberculosis
UNAIDS	The Joint United Nations Programme on HIV/AIDS
UK	United Kingdom
USA	United States of America
WHO	World Health Organization
XDR	Extensive Drug Resistant

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

This study investigated the information behaviour of medical doctors and professional nurses in five (5) selected district hospitals of the OR Tambo Health District in the Eastern Cape Province of South Africa. The chapter discusses overview of the research site, statement of the problem, aim and objectives of the study, research questions, significance of the study, delimitations of the study, structure and organization of the study. Siatri (1999) asserts that the concept of user studies started in the 1940 bringing to fore various complex concepts such as information and information need. Wilson (1981) believes that there is nearly no other field that has been researched in the field of information science like user studies. Furthermore, information needs have been at the focal point of user studies (Wilson, 1981). Given, Julien and Case (2012) on their part assert that information behaviour studies have not only multiplied in numbers in the past few decades but have also increased considerably in terms of context, topics covered and groups that are being researched.

Information behaviour of medical doctors and professional nurses is one of the areas that been investigated by researchers in various contexts around the world. Medical doctors and nurses are some of key role players in health care, who often work jointly with other medical staff to provide patient care. They make decisions that have implications for patient care. For example they make diagnosis and prescribe treatment for patients therefore they have to acquire and use information to ensure the decisions they make are appropriate for their patients. Nylenna and Aasland (2000) point out that doctors and nurses deal with patients who have undiagnosed problems and therefore need to be regularly updated in all fields of medicine so that they can be able to make appropriate diagnosis and institute appropriate treatment plans. The dynamic nature of the settings

that medical doctors and professional nurses work in requires them to keep abreast with latest developments in the field of medicine in order to provide quality care for their patients. Furthermore, the new medications are generally introduced at a rapid rate (Bennett et al., 2005). It is important therefore that information providers ensure the provision of timely relevant information for doctors and nurses. Information providers and information systems need to provide information that is accessible and up to date. In addition, medical doctors and professional nurses need to be equipped with skills to tap on all information sources available at their disposal. Today most of the health content comes in electronic format, this means medical doctors and professional nurses need to be able to use the electronic media with ease in order to benefit from the available information. However, there is paucity of competencies among doctors and professional nurses to access and use new medical technologies and procedures (Andualem, Kebede & Kumie, 2013).

Meijiman (2006); Gonzelez-gonzelez, Sanchez-Mateos, Riesgo-Fuertes, Escortel, Sanz-Cuesta and Hernandez-Fernandez (2007) point out that although medical doctors may use their knowledge and the information they get from patients, this is not enough to satisfy their information needs if not complemented with other information sources. The same could be argued about professional nurses, they need relevant information in order to support their nursing activities on daily basis. Liverman, Ingalls, Fulco, and Kipen (1997) posit that information needs of health professionals emanate from various factors such as patient care, research, and patient education amongst others. In this regard Burton (1994) posits that medical literature is imperative to health professionals in order to ensure that their tasks [in this case patient care] are done in an effective and efficient way.

Pakenham-Walsh and Bukachi (2009) suggest the demands for healthcare services at different levels of health service delivery system require the appropriate utilisation of information by the health professionals. Moreover, access to information from different sources by the medical doctors and professional nurses is a prerequisite for the delivery of quality healthcare services in rural and urban areas in both the developed and

developing countries (Chatterjee, Datta, Tamoghna & Sriganesh 2012). This point is emphasised by several studies on information behaviour of doctors and nurses (Ajiwon, 2006; Alghanim, 2011; Bennett, Casebeer, Kristofco & Collins, 2005; Bryant, 2004; Jones, Schilling & Pesut, 2011; Lappa, 2005; LeMay & Bocock, 2012; Ocheibi & Buba, 2003). Furthermore, studies by Bryant and Gray (2006); Weightman and Williamson (2005) have revealed that there exists a link between access to quality health information and quality health service. Medical doctors and professional nurses who have access to health information are well positioned to provide better quality services than those who have no or limited access to such information.

Despite the link between access to information and provision of quality health care services, there is still a lack of physical access to relevant and reliable information by medical doctors and professional nurses in developing countries especially in Africa (Pakenham-Walsh & Bukachi, 2009; Godley, Pakenham-Walsh, Ncayiyana, Cohen & Packer, 2004). Atani and Kabore (2007) further postulate that inequalities in health services are directly related to inequalities in information access. Pakenham-Walsh (2009, p6.) argues, "People are dying due to information poverty suffered by health professionals in developing countries".

In order to understand the information behaviour of medical doctors and professional nurses, it is important to establish an understanding of the term "information behaviour" and its associated terms such as information and information needs. Wilson (2000, p.49) referred to information behaviour as the "totality of human behaviour in relation to sources and channels of information, including both active (actively looking for information, like going to the library or searching the web) and passive (acquiring information unintentionally like watching TV or listening to the radio) information seeking and information use". Mutshewa (2007) is of the view that the term "information behaviour suggests the behaviour is of "information" rather than of "people" nature. Siatri (1999) notes that these terms are complex and not easily defined and as such there is no common understanding of the concepts associated with information behaviour in

literature. Consequently, the difficult in defining information has contributed to the difficulty in defining other terms such as information need. To some, information is defined as ideas that individuals contribute, seek or obtain from informal or formal discussions, investigation or study (Dresang, 2005). To others, information is defined as data that has been processed and given meaning in order to answer the user's query or assist in making informed decisions (Ojiboye, 2007).

Medline Plus (n.d) defines medical doctor, as a person licensed to practice medicine, while a registered nurse or professional nurse is a person licensed to practice nursing. For the purpose of this study, the term professional nurse will be used, as this is the nomenclature commonly known and applied in South Africa. Other known terms that are used to refer to doctors are clinicians, physicians and health professional.

This context provides the motivation to investigate the information behaviour of medical doctors and professional nurses in five selected district hospitals of the OR Tambo Health District. The purpose of the study was to understand the information needs, preferred information sources, and factors that facilitate or hinder the information seeking activities of medical doctors and professional nurses.

1.2 Overview of the Research Site

The OR Tambo district is located on the east of the Eastern Cape Province on the Indian Ocean coastline. The district is divided into five (5) local municipalities namely: King Sabatha Dalindyebo, Nyandeni, Port St John's, Mhlontlo, and Ingquza Hill. The district covers 96340 square metres and is predominantly rural with only 9.3% of its population residing in urban areas. The district has a population of 1 862 214 and is home to 306, 463 households. The district is poor, with more than two-thirds of the economically active population (71.5%) unemployed, and about four out of every five households (88%) living below the poverty line. About 93% of the district's population has no formal sanitation leading to occasional cholera outbreaks (Stats SA, 2012).

Furthermore, Eastern Cape is faced with great health burden arising from communicable and non-communicable diseases; maternal, child and neonatal deaths; violence and injuries among others. According to Day et al (2011), the main causes of death in the Eastern Cape are communicable diseases (18.1%) and other maternal and perinatal challenges (29.3%), HIV (26.2%) and TB (32.5%), non-communicable diseases (40.3%) and injuries (11.6%). The Eastern Cape is one of the provinces in South Africa with high prevalence of HIV. The UNAIDS report (2013b) estimated that 18.5% of Eastern Cape population is HIV positive. Antenatal women between the ages of 15-49 were the most affected at 28.1% in 2009.

Explaining the state of health care in South Africa, the South African Medical Research Council (SAMRC) (2016) says, "The quadruple burden of disease in South Africa is a cocktail of four colliding epidemics; maternal, newborn and child health; HIV/AIDS and tuberculosis (TB); non-communicable diseases; and violence and injury". According to Jenkins, Gunst, Blitz and Coetzee (2015) the burden of diseases in South Africa is also fuelled by critical shortages of medical doctors, especially specialists in hospitals and in clinics.

In 2003 and 2004 the department of health had a ratio of 4.4 staff for every 1 000 members of the population in the Eastern Cape province, making the Eastern Cape Department of Health the second-lowest in staff to population ratio in the country, compared with a national average of 5.8 (Jenkins et al., 2015)

The number of graduating medical doctors increased by 18% between 2000 and 2012; however this increment has not translated into an increased number of medical doctors in the country, as those who have been trained leave the country (Jenkins, et al., 2015). Jenkins and colleagues (2015), added that the situation in South Africa is not an isolated one; many African countries suffer from the same problem where the number of medical doctors to population is lower than 1/1000, with the ratio of medical doctors per 1000

unchanged between 2004 and 2011, at 0.77 and 0.76 respectively. In this regard the authors further point out that the retention of all health professionals is of the utmost importance in all district hospitals of South Africa. According to the Eastern Cape Provincial Health Consultative workshop (2010) inadequate numbers of medical doctors also negatively affects social security, as it becomes difficult for applicants to see a medical doctor, and this affects the issuing of social grants, and thus people's economic survival.

The Eastern Cape Provincial Health Consultative workshop (2010) points out that in the Eastern Cape Province, the realisation of people's right to health is threatened by the shortages of professional nurses. In some cases, patients had to wait for two weeks to be seen by a medical doctor. The Eastern Cape Provincial Health Consultative workshop (2010) reported overcrowding, which led to long queues and patients being sent home without being treated. The Consultative Workshop also suggest that since the year 2000 reporting of Eastern Cape health system-related problems have increased, both by politicians and the media. Problems such as food shortages, dilapidated infrastructure, overcrowding, lack of linen and the neglected state of mortuaries are some of the problems that dominate the news. In the light of these problems, Basu, Jina and Naidoo (2008) suggest that the key to the successful running of public health systems is the development of an efficient health system infrastructure and the practicing of evidence-based healthcare by health professionals.

Another problem affecting timely access to medical care reported in the Eastern Cape is the shortage of both ambulances and drivers of ambulances and bad road infrastructure. Lack of medicines was also a problem; so often people are sent home without medication or with only painkillers (Eastern Cape Provincial Health Consultative workshop, 2010).

These are the challenges that face public health practitioners in South Africa, and characterise the world in which medical doctors and professional nurses are expected to

make time to search for information. What is lacking is a platform to share experiences and together develop solutions in a scientifically informed manner. In this regard, the Public Health Association of South Africa (PHASA) was born. PHASA advocates equitable access to the basic conditions necessary to achieve health for all in South African as well as equitable access to effective healthcare (Basu, Jina, & Naidoo, 2008).

1.3 Statement of the Problem

Both medical doctors and professional nurses play a central role in the provision of quality health care services in both developed and developing countries. Therefore, it is imperative that their information seeking behaviours are clearly understood in order to create conducive environment that will support their information needs to achieve quality healthcare services. Pakenham-Walsh (2009) suggests that delivery of quality health services requires appropriate information to be made available to healthcare professionals. Similarly, Bryant and Gray (2006); and Weightman and Williamson (2005) have shown that there is a positive correlation between quality health service and access to information by both medical doctors and professional nurses. Understanding the information behaviour of medical doctors and professional nurses is therefore a critical factor in providing quality healthcare services (Bukachi, 2009; Godley et al., 2004).

Evidence from literature suggests that there are many studies on information behaviour or information seeking behaviour of various health professional groups, including medical doctors and professional nurses. The literatue further reveals that the focus of medical doctors' information behaviour studies has been on primary care of physicians. Examples of such studies include Alghanim (2011), who studied information needs and information seeking behaviour among primary care physicians in Saudi Arabia; Bennett et al. (2005) studied family physician's information seeking behaviours in the United States of America; Bryant (2004) researched information needs and information behaviour of family doctors; Norbert and Lwoga (2012) researched information seeking behaviour of physicians in Tanzania; and Gonzelez-Gonzelez, Sanchez-Mateos, Riesgo-Fuertes,

Escortel Mayor, Sanz-Cuesta and Hernandez-Fernandez (2007) conducted a study on information needs and information seeking behaviour of primary care physicicans in Madrid, Spain.

There are therefore not many studies on information behaviour of medical doctors working in hospitals. Besides, studies on medical doctors' information behaviour tend to concentrate on one aspect of information behaviour such as information sources or information needs instead of researching information behaviour as a totality of human behaviour. For example, Buyankhishig et al. (2007) undertook a study on clinical information sources used by hospital doctors in Mongolia; while Tumwikirize, Ogwal-Okeng, Vernby,Anokbonggo, Gustafsson and Lundborg (2008) studied access and use of medicines information sources by physicians in public hospitals of Uganda. The current study in a departure from previous studies seeks to explore all aspects that relate to information behaviour of medical doctors and professional nurses such as roles and tasks, information needs, attitudes towards use of information, factors facilitating or hindering seeking of information, and information sources.

In the South African context, literature shows attempts to understand information behaviour of various groups of citizens such as academics, learners, and entrepreneurs. A significant number of articles published from 2000 on information behaviour in South African context have been reported by Stilwell (Stilwell, 2010). However, the results of this review demonstrate very little research concerning information behaviour of medical doctors and professional nurses. Comparatively, around the world, significant research about information behaviour of health professionals such as medical doctors, professional nurses, and pharmacists exists. However, these studies are hardly replicated in South Africa as revealed by a search in databases such as Library and Information Abstract (LISA), SABINET, Medline plus and PubMed.

Fourie and Claasen-Veldsman (2007, 2011); Naidoo, Jinabhai and Taylor (2010), Ricks and Ham (2015) seem the only researchers who have endeavoured to research information behaviour of medical professionals. However, these studies fail to provide a comprehensive empirical insight into the information behaviour of medical doctors and professional nurses. Fourie and Claasen-Veldsman (2011) conducted an exploratory study of the needs of South African oncology nurses working in specialised units. In 2009 Fourie further undertook a literature review of information behaviour of health professionals, including medical doctors and professional nurses. However, the focus of the study was reviewed literature that did not focus on South Africa. Naidoo, Jinabhai and Taylor (2010) in their study concetrated on information sources used by doctors to obtain information on HIV and AIDs. A recent study by Ricks and Ham (2015) on information needs of professional nurses at the point of care conducted in the Eastern Cape only focused on one aspect of information behaviour "information need" of nurses.

Taking into consideration the state of health care in South Africa, especially in the rural parts of the country, there is need for research that comprehensively investigates information behaviour of medical doctors and professional nurses.

Besides, in South Africa, the burden of HIV/AIDS epidemic is compounded by the lack of access to health information, especially for medical doctors and professional nurses working in rural and semi-urban areas. This situation has negatively affected the effective delivery of healthcare (Gebru, 2013). Understanding information seeking behaviour of both medical doctors and professional nurses in the context of rural South Africa is essential in order to appreciate how medical doctors and professional nurses use information to manage patients.

In the Eastern Cape Province Massyn, Day, Barron, Haynes, English and Padarath, (2012) assert that poor health outcomes continue to be reported especially in O.R Tambo Health District (De Waal, 2012). Health Systems Trust (2013) reported the challenges

faced by the district, to include shortage of medical doctors, Tuberculosis, high prevalence of HIV and AIDS, child malnutrition and poor maternal health. Moreover, the district has the worst new born death rate, at 20.8 new born; per 1000 birth exceeding the national average of 10.2 at any one given time according to the 2013 statistics (De Waal, 2012). Therefore understanding the information behaviour of medical doctors and professional nurses should help information providers to provide them with information they need to manage these problems.

The results from this study are expected to contribute towards improving health care service delivery, and in enabling policy makers to develop relevant information policies that will enable collection and provision of relevant information for medical doctors and professional nurses in hospital settings, not only in OR Tambo Health District but the rest of South Africa. The study will also contribute new knowledge on the domain of information behaviour of medical doctors and professional nurses from the perspective OR Tambo Health District and of South Africa as a whole.

1.3.1 Aim and Objectives

The aim of the study was to investigate the information behaviour of medical doctors and professional nurses in the five selected district hospitals of the OR Tambo Health District in the Province of the Eastern Cape. The study sought to address the following objectives:

1) To establish the roles that medical doctors and professional nurses play in the five selected district hospitals of OR Tambo Health District.
2) To understand the tasks that medical doctors and professional nurses play in the five selected district hospitals of OR Tambo Health District.
3) To determine the information needs of medical doctors and professional nurses working in the five selected district hospitals of OR Tambo District.

4) To find out the channels and sources of information preferred by medical doctors and professional nurses working in the five selected district hospitals of OR Tambo District to fulfill their work roles.
5) To assess the factors that influences the information behaviour of medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District.

1.3.2 Research Questions

Five research questions were developed guided by Leckie et al. (1996) general model of information behaviour of professionals. The four research questions are:

1) What roles do medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District perform?
2) What tasks do medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?
3) What are the information needs of medical doctors and professional nurses in the five selected district hospitals?
4) What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals?
5) What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals?

1.4 Significance of the Study

This study seeks to understand the information behaviour of medical doctors and professional nurses in the district hospitals in OR Tambo Health District in South Africa.

The findings from this study are expected to contribute towards improving the ongoing implementation of the National Health Insurance (NHI) reforms. NHI is at a pilot stage of implementation in some South African districts including OR Tambo. It aims at providing free universal quality health services for all South Africans at the point of care.

Understanding the information behaviour of medical doctors and professional nurses could provide better insight into the information infrastructure required to support the NHI. The results of the study are also expected to provide the basis for developing policies related to the provision of information services to medical doctors and professional nurses in public hospitals in South Africa. Lastly, from the practical perspective, knowledge of information behaviour of medical doctors and professional nurses will assist information providers such as health science libraries and health resource centres in the Eastern Cape to re-engineer their services to suit information seeking behaviour of medical doctors and professional nurses. The study responds to the "Health Information for All by 2015" campaign of the Global Healthcare Information Network (HIFA) that advocated for efforts to ensure that health professionals had access to adequate quality and relevant information by the year 2015.

1.5 Delimitation of the Study

The delimitation of the study refers to those things that limit the scope of the research, the various boundaries that the researcher sets for her/himself in order to manage the study (Simon, 2011). The researcher focused on information behaviour of medical doctors and professional nurses and excluded other health professionals such as nursing assistants, staff nurse, pharmacists, radiologists etc. The decision to delimit the research to medical doctors and professional nurses was motivated by the fact that medical doctors and professional nurses are the backbone of the healthcare system. Medical doctors make clinical decisions about the patients. They do diagnosis, treatment and referrals. Besides, professional nurses play a supporting role to medical doctors. Though medical doctors have the overall responsibility for patient care, the first point of call for patients in a hospital is professional nurses who monitor patients throughout their admission and escalate the matter to medical doctors. It is therefore crucial that information behaviour of both groups is understood because they are crucial in patient care. This study also focused only on district hospitals and did not cover other types of hospitals.

1.6 Structure and Organisation of the Thesis

Chapter One: Introduction: This chapter gives the background to the study and presents the statement of the problem, research questions, aim and objectives, significance of the study, and delimitation of the study.

Chapter Two: Theoretical Framework: This chapter presents the theories and models of information behaviour.

Chapter Three: Literature Review: This chapter presents empirical and theoretical literature covering the following themes: roles and associated tasks of medical doctors and professional nurses within hospital setting; the information needs of medical doctors and professional nurses and how they use information; how medical doctors and professional nurses seek information in order to perform their tasks as well as factors that facilitate or hinder medical doctors and professional nurses when seeking information. Gaps in literature are isolated and how these are addressed by the study outlined.

Chapter Four: Methodology: This chapter presents research paradigm, research approach, research design, population and sampling procedures, data collection methods, data analysis, validity and reliability of the instruments, and ethical considerations.

Chapter Five: Research Findings: This chapter presents the findings of the study on the information behaviour of medical doctors and professional nurses working in five selected district hospitals of the OR Tambo Health District.

Chapter Six: Discussion of the Findings: This chapter discusses research findings using extant literature and theory.

Chapter Seven: Summary, Conclusion and Recommendations: This chapter summarises the findings, conclusion, recommendations, and potential future research areas.

CHAPTER TWO

THEORETICAL FRAMEWORK

2.1 Introduction

This chapter presents the theoretical framework upon which this study is based. According to Miles and Huberman (1994), a theoretical framework refers to a "written or visual presentation that explains the main things to be studied, such as key factors, concepts and the presumed relationship among them, either in a graphic or narrative form" (Miles & Huberman, 1994, p.18). Grant and Osanloo (2014) argue that a theoretical framework serves as the foundation from which all knowledge for research is constructed. The theoretical framework therefore informs every decision made in the research process especially the research questions and objectives.

This study sought to investigate the information behaviour of medical doctors and professional nurses working in five selected district hospitals in the OR Tambo health district in the Eastern Cape Province of South Africa. In this chapter, several information behaviour models widely used in library and information science research such as Wilson's 1981 information-seeking model, Wilson's 1996 general model of information behaviour, Dervin's 1983 sense-making model, Ellis's 1993 information-seeking model, and Kuhlthau's 1991 information search process model were reviewed. The list of information behaviour models presented in this chapter is by no means exhaustive and only those considered relevant to the study are discussed. The study was underpinned by Leckie *et al*. 1996 general model of information-seeking behaviour for reasons that are subsequently addressed in this chapter.

2.2 Overview of Information Behaviour Models

With the increasing studies on information behaviour, there was a need to develop models that provide the framework for understanding a user's information behaviour.

Dervin and Nilan (1986) are amongst the early researchers who sparked debate about the lack of models for information behaviour studies. The debate served as a stimulus for various researchers to begin developing models that explain how information users manoeuver when looking for information. Since then, many researchers have dedicated their time to building the foundations for understanding why, when and how information users seek and use information. Consequently, several information behaviour models have emerged (Wilson, 1999). According to Elsweiler, Wilson and Lunn (2011, p. 213), such information behaviour models assist people to "internalise, communicate and investigate observed phenomena during the information-seeking process". Such information behaviour models serve to meet a diversity of needs and therefore are different in nature. Some information behaviour models, such as the Ellis's six generic search activities, are simple, primarily consisting of a list of activities that the information searcher pursues in an attempt to find information to satisfy a need, whilst others, such as Wilson's information behaviour models, are more analytic in nature. Some models focus on certain aspects of information behaviour. For instance, the Ellis's model for generic search activities, examines specifically the behavioural aspect of information behaviour. In addition, other information behaviour models seek to understand information behaviour in a specific environment such as Web (Choo, Deltor & Turnbull, 2000). Yet other information behaviour models investigate information behaviour in a specific context such as everyday life information-seeking (Savolainen, 1995) or Belkin's model (1993) that focuses on information behaviour in the context of information retrieval.

2.2.1 Wilson's Models of Information-seeking behaviour (Wilson, 1981(a); Wilson, 1981(b)

Wilson developed a series of models that have evolved over the years, starting in 1981. The two models developed by Wilson in 1981 originated from his 1971 Doctoral seminal presentation (Wilson, 2007). Wilson (2007) concedes that the models are not isolated from each other but rather interrelated, with each model providing the foundation for the subsequent model. The first Wilson model is concerned with how needs arise and how

the information seeker satisfies those needs. Wilson proposed that information-seeking arises out of the recognition that there is information need to be satisfied. In turn the information seeker makes demands upon formal and informal information sources, which may result in success or failure to satisfy the information need. Successful information-seeking will either fully or partially satisfy or completely fail to satisfy the information need. Wilson further suggests that if information is regarded as useful, the information seeker uses it or passes it on to others to use (Wilson, 1999). In the event that the information need has not been met, the information searcher may choose to restart the process or consider alternative information-seeking strategies. In this model Wilson acknowledges that information-seeking behaviour may involve other people, by means of an information exchange. Figure 1 is the schema showing how Wilson perceives the process of information-seeking:

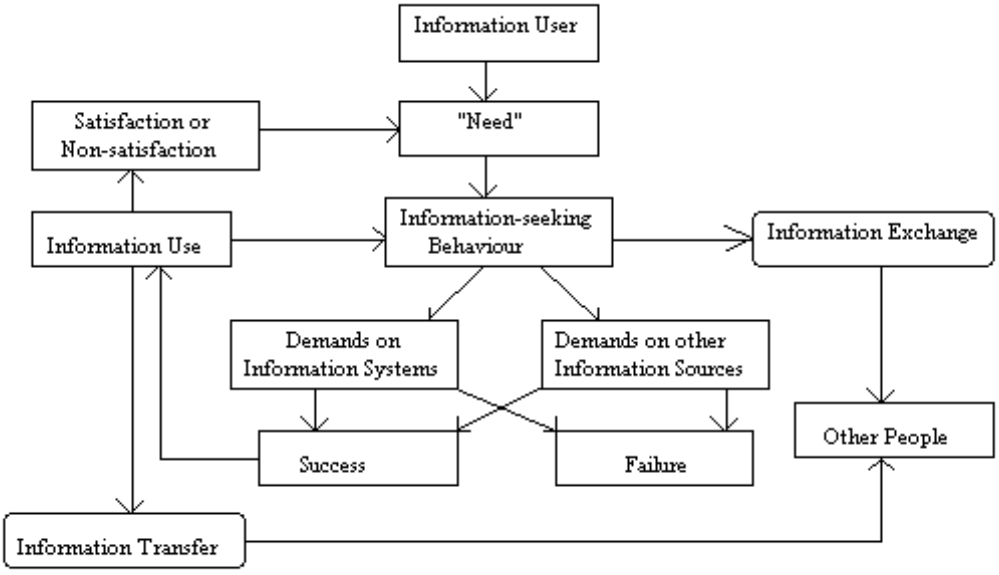

Figure 1: Wilson's model of information-seeking behaviour of 1996 (Source: Wilson, 1999, p251)

The strength of the above model is that it recognizes that the information-seeking process has an end phase, and that the process in the end is either successful or unsuccessful. Wilson acknowledges that information-seeking has to end at some point and is not

without hurdles, for the result may either be a success or failure. Xie (2008) concurs, and notes that various factors such as the information seeker's knowledge structure, goal, tasks, IR system design and social and organisational context affect information-seeking. The acknowledgement by Wilson of the varying degrees of need satisfaction is another essential element of the model. Wilson further concedes that information retrieved may satisfy, partially satisfy, or fail to satisfy the need. Information-seeking, even in cases when there is an abundance of information, does not essentially guarantee fulfilment of the information need. As Wilson argues that the information might satisfy the need in part or full or be irrelevant to the need. When retrieved information fails to fulfil the needs of the person who searched for it, the same information may be relevant to other people (Wilson, 1999). In case of retrieving irrelevant information, which cannot be used to meet the recognised need, Wilson acknowledges that such information can be transferred to other people, either verbally or in written format. The information exchange aspect is missing in most models, as they tend to concentrate on the process of information-seeking without explaining what happens if information is not relevant to the searcher's needs. The inclusion of the element of information use demonstrates that Wilson regards information-seeking as a goal-orientated process. However, the weakness of the model is that despite explaining that information-seeking maybe a success or failure, it does not attribute success or failure to any variable such as source characteristics (for instance format or type or demographic characteristics such as age or gender). There are also no indications of causative factors that would determine whether an information seeker chooses formal or informal sources.

Wilson's second 1981 model tries to include more features. In this model, Wilson shows the context of the information need and how an information need arises. As with the first 1981 model, the context of the information need remains the person himself/herself. Wilson (1999) asserts that information need is not the fundamental need but is driven by other basic needs such as a cognitive need (the need to learn in order to get a better understanding of the world), physiological need (the need for shelter or food) or affective need (the need for attainment). Barriers to information-seeking that the information

searcher will encounter in an effort to get information are also mentioned. These barriers arise in the same context, as information needs (Wilson, 1999). Due to the new features that were not present in the first 1981 model, Wilson (1999) called this model a macro model or a model of gross information-seeking.

Wilson's second 1981 model further proposed that the context of the information need might be the person himself or herself, the person's work demands, or life in general. Wilson asserts that information needs in various work roles will be different. In addition, Wilson suggests that the context of the information need can be the environment, in which one lives, or factors such as technological and economic requirements, which influence information needs. For example, Wilson (1996) suggests two categories of economic factors that influence information-seeking, namely the direct economic cost and the value of time. Information-seeking may not be pursued if a high cost is anticipated or if the process is perceived as time consuming.

In figure 2 is the schema of Wilson's second information behaviour model, which he refers to as a model of gross information behaviour aimed to improve the first 1981 model by adding two major propositions. Firstly, information need is not a primary need but is driven by other basic needs and secondly; barriers exist in the process of information-seeking.

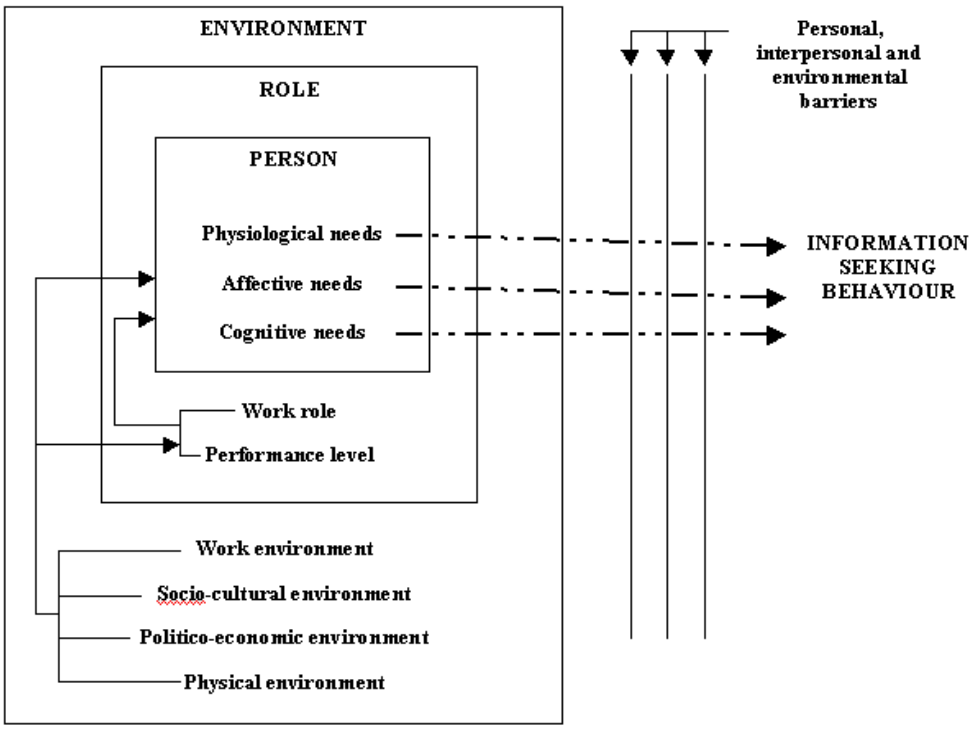

Figure 2: Wilson's second model of 1981 (Source: Wilson, 1999 p252)

In 1999, Wilson released a new version of his second 1981 model where he incorporates Ellis' information strategies stage as shown in figure 3.

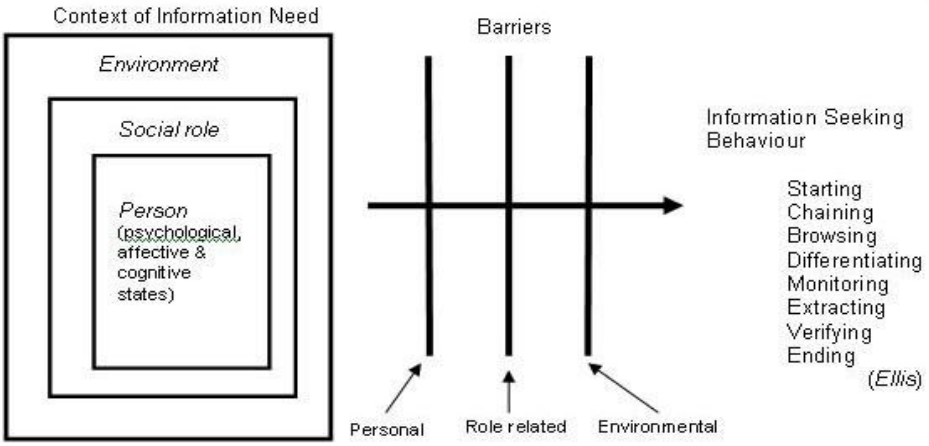

Figure 3: Wilson's revised second 1981 model of information-seeking behaviour (Source: Wilson, 1999, p252)

In the above model (figure 3) Wilson further improved his second model of 1981, making no major additions, but instead incorporating Ellis's generic search activities namely; starting, chaining, browsing, differentiating, monitoring, extracting, verifying, and ending. Wilson adopted the search activities to demonstrate stages that information seekers engage in during the information-seeking process. The strength of Wilson's second model of 1981 is its recognition that not only work-related needs trigger information-seeking; but also life in general activates information-seeking. Wilson (1999) also suggests that the model can be considered a source of a hypothesis, as it overtly explains things that may influence information needs such as information searcher traits, and the fact that different work roles will lead to different information needs.

There is some over-simplification in both Wilson's models. For example, in the first 1981 model there is no clear indication as to whether the barriers mentioned play a role in a person's decision to seek information or not; what happens when the information searcher is confronted with these barriers along the way; if the process is abandoned, or new ways of searching are adopted. Furthermore, it is not clear how the contexts of information need impacts on a person's search for information. The model does not refer to information use, which would have explained why information was needed in the first place. In the second model, Wilson explains that once the need is recognised, a person makes demands upon formal or informal sources, but does not explain the determinants that influence a person's decision to use formal or informal sources.

2.2.2 General Model of Information behaviour (Wilson, 1996)

Wilson's 1996 model is a revision of his 1981 model, which he calls a model of methodology, as it explains information behaviour at a macro level (Niedzwiedzka, 2003). The model is built upon the two previous models of 1981. According to Wilson (1999) model as with previous models, the focus of this model remains the person in his or her context. With this model Wilson drew upon research in other fields such as psychology, innovation, decision-making, health communication and consumer research (Wilson, 1999). In the 1996 model, instead of barriers, Wilson uses the term "intervening

variables", suggesting that they may either hinder or assist the information-seeking process (Wilson, 1996). He identifies the intervening variables as psychological, demographic, role related, environmental and source characteristics. Four ways of acquiring information during information-seeking are identified as passive attention, passive search, active search, and ongoing search. Passive attention is the acquiring of information unintentionally, for example while watching TV or listening to a radio. Passive search is when a certain individual behaviour leads to the acquiring of information that happens to be relevant to the person's information needs. Active search refers to the individual's active search for information, as driven by the need. Ongoing search refers to continually searching for information to update one's knowledge. Wilson contends that if an information need is to be satisfied, it is necessary that information process and use become part of the information loop. The Wilson macro model is enriched by the inclusion of three theories. To demonstrate what leads to information seeking and what does not, Wilson explains the theories. Firstly, there is "stress/coping". Secondly, the "risk reward theory" explains why some information sources are likely to be used more than other information sources. Lastly, "self efficacy" refers to how the ability of people to search for information influences their decision to seek or not to seek information (Wilson, 1999). Figure 4 below illustrates the Wilson's 1996 general model of information behaviour, which is the result of integrating his two previous 1981 information-seeking models:

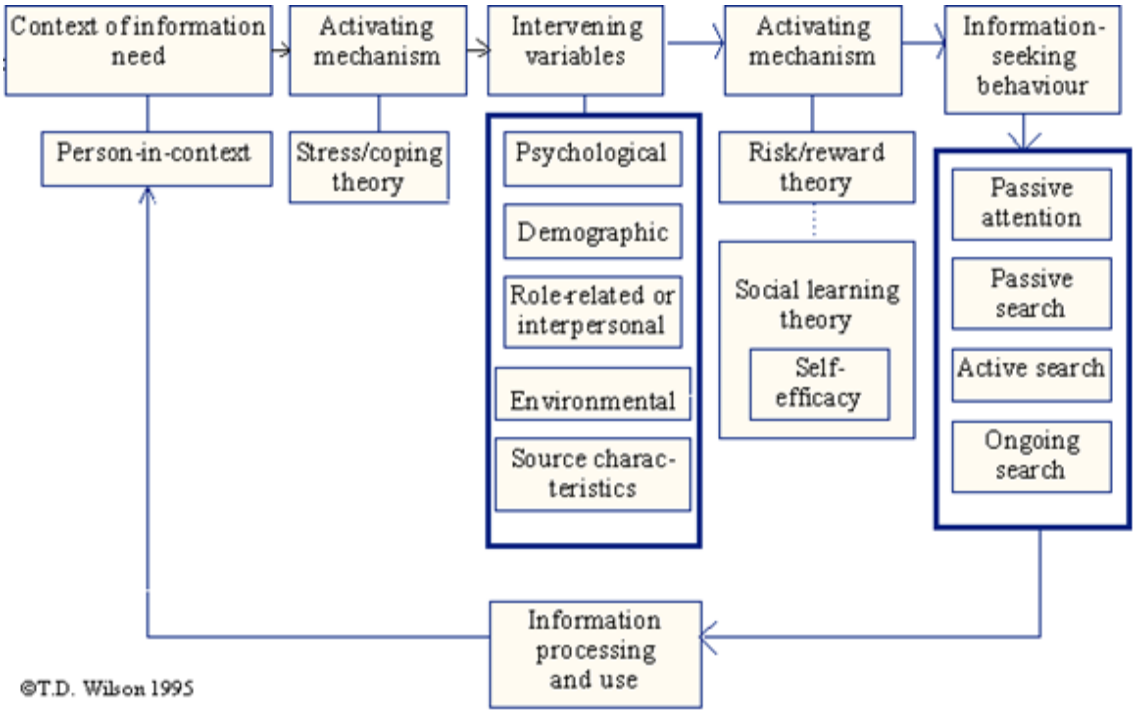

Figure 4: Wilson's 1996 general model of information behaviour (Source: Wilson (1999, p257)

The above model remains a model of gross information-seeking. Its strength comes from the incorporation of the new components that were not part of the previous models. The new components include, firstly, the re-naming of barriers as intervening variables, suggesting that the variables not only hinder information-seeking but also can be supportive of the process. In the first models, Wilson concentrated on barriers that impact negatively upon the process of information-seeking. In this model he acknowledges that the same factors might be both a hindrance and a help to the information-seeking process. For example, a lack of information literacy skills is more likely to hinder information-seeking whilst a high level of the same skill is likely to enhance the information-seeking process. Secondly, the model identifies different ways of acquiring information - passive attention, passive research, active research and ongoing research by highlighting information-seeking ways, Wilson demonstrates that information seeking is not always a

conscious decision. Lastly, the model shows how the acquired information is assimilated and becomes one's knowledge during the processing and use of information. The processing and use of information are also some of many facets missing in other information models. Wilson also acknowledges that not all information needs evoke the need to seek information especially given the inclusion of theories of information-seeking that have been explained above, such as stress coping, risk reward and self-efficacy. These aspects of information behaviour make this model a broad framework for the information-seeking process.

Though the model addresses major aspects of information behaviour, the inclusion of the new facets does not make the model complete. The model is presumed to be applicable to a wide range of users; however, it lacks some significant elements. For example, it is not clear how the context of information need impacts on a person looking for information. Unlike the first models, this model does not differentiate between information sources and their influence on information behaviour. The focus of the model is information-seeking, though it is called an information behaviour model. While Wilson's 1996 model of information behaviour covers most aspects of information-seeking behaviour, it does not fit the purpose of this study. The limitation of this model with regard to this study is that the nature of the information need is not explicitly explained. It does not give factors that lead to information behaviour. The current study covers ground that has not been researched in the South African context; therefore, it is important to get a comprehensive understanding of the subject. The Wilson 1996 model could be regarded as a first step into developing the general model of information behaviour. Niedzwiedzka (2003) believes that the model could stimulate debate towards the development of a more complete and general model. Wilson (2005) also underscores the importance of a general model of information-seeking behaviour.

2.2.3 Nested Model of Information behaviour (Wilson, 1999)

Wilson attempted to develop a more general model of information behaviour, which he termed a "nested model" of information behaviour. This resulted from conceptual analysis of various models of information-seeking. The model is based on the premise that information behaviour is an umbrella word with information-seeking and information searching as sub-sets of information behaviour (Wilson, 1999). Figure 5 below illustrates Wilson's nested model of information behaviour.

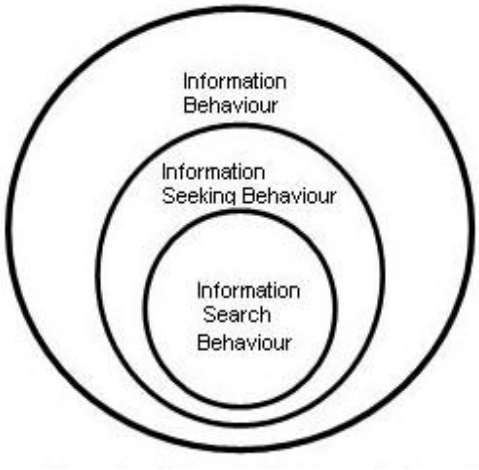

Figure 5: Wilson's 1999 nested model of information behaviour (Source: Bawden & Robinson, 2012, p189)

Though Wilson's nested model of information behaviour, along with the many others mentioned, cannot be considered complete, it was, however, Wilson's attempt at demonstrating information behaviour as a totality of human behaviour. Wilson was trying to show that information behaviour does not exist in isolation but exists as three realms, notably information behaviour (which is a general field focusing on total behaviours as a response to information need), information-seeking (which outlines ways used to seek information and various reasons for seeking information) and information searching (which outlines strategies used when the information seeker interacts with various information systems in pursuit of information). Another attempt to model information behaviour was made by merging Wilson's 1999 and Dervirn's' 1993 models to extend the model beyond information-seeking where Wilson's barriers were replaced by

Dervin's gap metaphor, an element of Dervin's sense making model to be discussed in the subsequent section. These attempts also did not produce what could be regarded as a comprehensive model; they instead served as a foundation for developing a general model.

Although there is an abundance of models related to information behaviour, the endeavours toward achieving a comprehensive general model that would be applicable to all users have not yielded satisfactory results. It is hoped that the current study will add value in developing an information-seeking model for medical doctors and professional nurses that may also be used as part of the building blocks to the process of developing an information behaviour model that would be more comprehensive and general in nature.

2.2.4 Sense- making Model of Information Behaviour (Dervin, 1983)

Dervin developed the model in 1972, and continued to synthesise it over the years. According to Dervin (1992), the model is a set of meta-theoretical assumptions that have resulted in methodologies to follow when seeking information. The concept "sense making' is a label for a set of concepts and methods employed in an attempt to understand how people construct meaning in their world (Dervin, 1983). The model emanates from Dervin's work in communication research and originally developed to shift from the "system focused communication research" to research on information and use. Dervin's sense making approach model tries to make sense of what people do when interacting with information thereby focusing on information behaviour. The model is based on four elements, namely situation, gap, bridge, and outcome. A ***situation*** refers to the need for information-seeking and the context in which information-seeking takes place. The situation explains why the information problem arises. ***Gap*** refers to the knowledge gap that prompts the user to seek information; it explains the individual's awareness of the situation. The ***bridge*** refers to the way the gap is closed; it can be a librarian or the internet that provides information needed to close the gap. The ***outcome***

refers to the results of the sense-making. The outcome could be the discovery of the right information that assists in closing the gap or it could be irrelevant information that compels the information searcher to find another bridge to close the gap and make sense of the world around him/her (Wilson, 1999).

The model assumes that there is a gap between the information searcher and the answer to his/her question. According to Dervin, the model allows the information searcher to understand her or his circle of reality. This happens as the information searcher tries to create a view of the world around him through observations in time and space as well as all attempts to close the information gap. The gap is caused by the fact that the information searcher does not have information, and in many cases does not know where to find the information. The information seeker may go to a place like a library to get information, and the information provider such as a librarian could become a bridge for the information searcher, by providing an information tool in the form of either a database or catalogue (Wilson, 1999). The model further shows how an information searcher manoeuvres his/her way in an information environment such as a library in order to make sense of the gap. The model further suggests there is a constant interaction between the situation that caused the person to seek for information, the gap, and the systems the person is interacting with. The person must make sense of the gap as she/he moves either physically or cognitively. Due to communication problems between the information searcher and the bridge, the seeker's need might not be fulfilled (Wilson, 1999). Figure 6 represents situation, gap, and outcome in a triangle. Similarly, figure 7 represents the same elements but also includes the bridge metaphor.

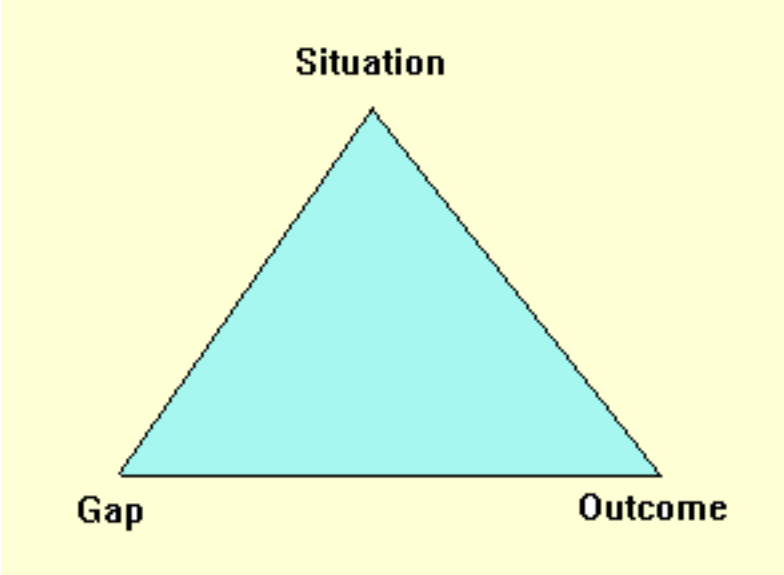

Figure 6: Dervin's sense-making triangle (Source: Wilson 1999, p253)

The triangle represents a situation (the reason why information is needed) that leads to a gap (the lack of knowledge to deal with the situation) resulting in a desired outcome (result of the sense making process).

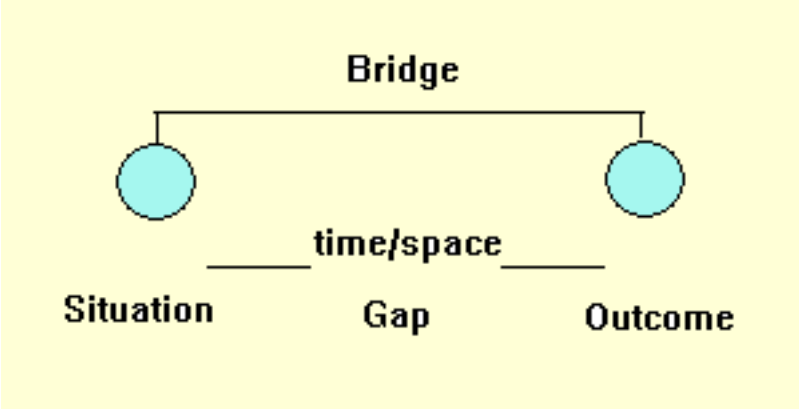

Figure 7: Dervin's sense-making model (Source: Godbold, 2006, p254)

The Dervin model further demonstrates how the information searcher develops strategies to cope with challenges. In Figure 7 the model now includes the bridge that the information searcher makes use of in order to cross to the sense making side. It shows

that information-seeking is an intense process that has to be executed painstakingly. The strength of the Dervin model lies in its ability to demonstrate the challenges that an information searcher goes through; and how she/he navigates through them to reach the bridge in order to close the knowledge gap (Godbold, 2006). Dervin's model presents a detailed strategy that information searcher can use to cope with the obstacles they encounter as they are trying to make sense of the world around them (Godbold, 2006). It also acknowledges that communication problems may lead to the failure of the bridge to make sense of the situation.

The weakness of the Dervin model is that it assumes that the information searcher possesses the skill and expertise to manoeuvre his/her way and make sense of the information gap. The model assumes that the person searching for information is able to develop strategies to deal with and overcome obstacles on his/her own. It depicts information-seeking as a sequential chain that starts with a person experiencing the information need, and then looking for information and subsequently using the information. The model portrays a perfect world where those looking for information have the expertise and patience to do so. It disregards the fact that information-seeking can be an arduous assignment to those who are not information literate. In the electronic environment, it can be more complicated and challenging to seek information due to information overload. Much of the information that is found on the internet requires that those searching for it should have the ability to filter information, in order to get what is relevant to their needs. The model also fails to recognise that information retrieval systems can fail to respond to or are not flexible enough to provide information sources that respond to the information searcher 's needs. For an information retrieval system to be useful, it has to supply information that responds to the specific information gap of the information searcher.

The model is not quite relevant for the current study, as it is neither explicit enough in terms of explaining, for instance, whether the outcome, (the result of the sense making process) is what the user was expecting; nor what happens if the outcome is not the

desirable one. In addition, in terms of the bridge, which can be explained as information sources, it is not clear if there are any variables that determine use or non-use of the bridge. The model has been criticised by Wilson (1999) as being abstract. Information behaviour researchers have to be aware that information searchers experience problems related to a lack of information literacy skills or system dysfunction, forcing the information searcher to abandon the process. The process can be abandoned for a certain period while the information searcher learns new strategies so that the search can be resumed. The search process can be abandoned indefinitely, if the information searcher decides that s/he can live with the information gap. Case (2005) noted that people might avoid pursuing information-seeking if they believe it will cause them some emotional discomfort. With all of the above complexities, the information-seeking process cannot be assumed as straightforward.

The current study sought to understand the intricacies of information seeking described above, in order to demonstrate differences if any in the information-seeking behaviour of medical doctors and professional nurses from the context of South Africa.

2.2.5 Ellis's Model of Information-seeking Behaviour (Ellis, 1989)

Ellis's model was derived from observing the patterns of information-seeking behaviour of academics and researchers including social scientists, research physicists and chemists, research scientists and engineers (Joseph, Debowski, and Goldschmidt, 2013). The Ellis model was based on information-seeking in a library environment using paper-based information sources (Joseph *et al*., 2013). Though the model was used in the aforementioned studies, it can also be applied to any other group of information users (Choo *et al*., 1998). The model is based on six generic search activities: starting, chaining, browsing, differentiating, monitoring, and extracting. Ellis elaborates on the different behaviours that the information searcher goes through. Ellis mentions that the user's interaction with the six generic search activities will be determined by the individual's information activity patterns at a particular point in time. However, it is clear

that starting will precede all processes while ending will close the process. The rest of the search activities don't follow any particular order; they can happen at any time during the search process. According to Choo *et al.* (1998), Ellis's behavioural characteristics suggest that information retrieval systems could be improved by including features that support the activities. The search activities are discussed in more detail below:

***Starting*:** This stage involves selecting the starting point and choosing initial material to search, which may include identifying references to start the process. The references often include sources that are familiar to the information seeker and those that are believed to have information that would be relevant to the need. It involves consulting literature, library catalogues, indexes, and asking colleagues (Meho & Tibbo, 2003).

***Chaining*:** At this stage the information searcher follows chains of citation in order to discover new sources. Following leads from an initial source, the information searcher tries to make a connection between the sources that were identified during the starting phase. Chaining can be backward or forward. Backward chaining is when references from an initial source are followed and forward chaining involves identifying other sources that refer to the initial source of documents such as citation (Meho & Tibbo, 2003).

***Browsing*:** At this stage the search is still semi-structured. The information searcher is casually looking for information in areas of interest. Browsing includes the scanning of published journals and tables of contents as well as references and abstracts from retrospective literature searches (Meho & Tibbo, 2003).

***Differentiating*:** At this stage the information searcher ranks information sources according to their relevance to his/her information need. According to Ellis (1989) during the differentiating stage the information searcher tries to filter and scan information sources in order to select sources that are relevant, and also notes and differentiates between the nature and quality of the various sources. Ellis further suggests that how the information searcher does the differentiating of information sources will depend on factors such as the searcher's previous experience with the information source, and the recommendations the searcher's personal contacts have given (Ellis, 1989).

Monitoring: This refers to the monitoring of particular sources in the field of interest, in order to keep abreast of the developments in that particular field. The focus is on core sources of information that can be obtained through personal contacts and publications. The core sources may include publications and person contacts (Wilson, 1999).

Extracting: This refers to the extracting of relevant material or material of interest and working from an information source systematically. The extracting of material can be done directly by consulting the information sources or indirectly through browsing indexes, bibliographies, or online databases (Wilson, 1999). Below are Ellis's generic search activities:

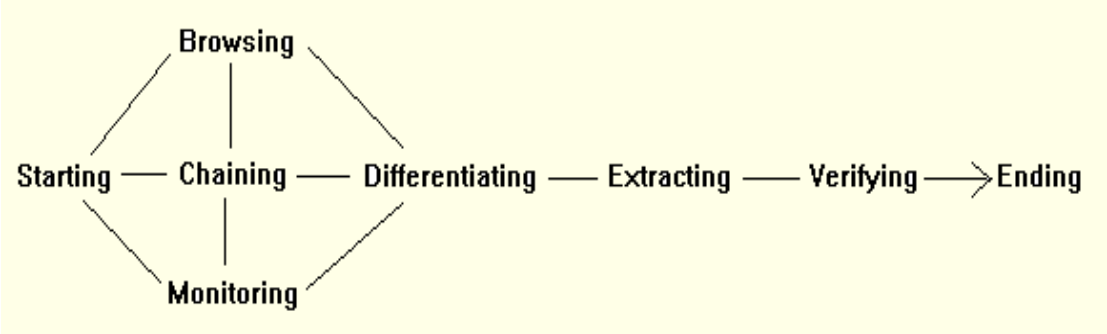

Figure 8: Ellis's process model (Source: Wilson, 1999, p255)

The strength of the model is that it is based on empirical research and as such has been used in many related studies. For example, it was used in a joint longitudinal project between the United Kingdom, and the United States for investigating users' mediated information searches and retrieval processes (Wilson, Ford, Ellis, Foster & Spink, 2002). It was also used modelling the information behaviour of scientists (Meho & Tibbo, 2003). Ellis's model can also be credited for recognising that the information-seeking process has a start and an end. It also recognises that the process of information-seeking has to start at a particular phase characterised by certain features, and end at a particular point in time, whether the need has been fulfilled or not. After ending at a particular point, the process may be repeated using other avenues of searching if the need was not fulfilled. The model encompasses a holistic view of information-seeking including

thoughts, feelings, and actions (Wilson, 1999). According to Choo *et al*., (2000), Ellis's model can also be credited for including features that support information seeking on the web. Meho & Tibbo (2003) confirmed the applicability of the model in a study of the information-seeking behaviour of people using an on-line library catalogue and the internet. The respondents in Meho and Tibbo's study demonstrated all Ellis's search activities. However, Meho and Tibbo also realised that in order to understand the information-seeking processes of scientists, new search activities needed to be incorporated. The new activities are accessing, networking, verifying, and information managing (Meho and Tibbo, 2003).

The inclusion of accessing in the model emanated from the fact that, respondents in Meho and Tibbo's study "modelling the information seeking behaviour of social scientists: Ellis' study revised" mention the issue of access being a problem. Thus Meho and Tibbo felt it is important that the model incorporate the "accessing" element. Networking is about keeping contact with people who have knowledge of the topic or working on the same topic. The authors felt that networking is an important element of any researcher's information searching process. Regarding verifying, the respondents in Meho and Tibbo's study were concerned about lack of reliability of the materials they accessed through government organisation and the information accessed through the internet. It transpired that respondents in the study had to first verify the authenticity of the material from other people like colleagues. Regarding information management, the respondents in the study raised the need to organise information properly. Thus, Meho and Tibbo termed this as information management and this is how the new activates were incorporated in Ellis's model (Meho & Tibbo, 2003).

The weakness of Ellis's model is that it shows the information behaviour process starting at the searching stage, without identifying where the need for information started. Secondly, Ellis's model is a list of activities that an information searcher performs; it does not relate to how the information-seeking process takes place, what information

sources are used, and what determines their use. The model does not elaborate on obstacles that information searchers stumble upon during information-seeking.

2.2.6 Kuhlthau's Information Search Process Model of Information-seeking behaviour (Kuhlthau, 1983)

The model began as a framework that Kuhlthau used for a qualitative study of secondary school students, and was later used to verify the behaviour of various library users, through quantitative and longitudinal studies. It was through these longitudinal studies that the model was refined (Kuhlthau, 2004). Kuhlthau's first attempt at using this model was in 1983, when she conducted a qualitative study on the information-seeking behaviour of high school students, motivated by her interest in the way students seek for information. The model has been improved over the years. In 1986, Kuhlthau tested the model on the same group of students, looking at their perception of information-seeking behaviour. Again, in 1987, she looked at how students had changed their search processes after they had been to college for four years. In 1988, she investigated whether students in different grades had different perceptions of the information search process. In 1989, she investigated the information-seeking behaviour of various library users. Subsequently, Kuhlthau used the model on various groups of people in the work place, which included security analysts and lawyers. The intention was to improve the interaction between the person searching for information and the system (Kuhlthau, 2004).

According to Kuhlthau's (2004) ISP model, the information searcher goes through six stages: initiation, selection, exploration, formulation, collection, and presentation.

Kuhlthau (1991) also points out that a complete model would be the one that includes cognitive, affective, and physical elements. Choo (2006) describes the cognitive factor as related to the perception that the information searcher has regarding the quality of information source. Affective factor relates to the motivation and interest of the information searcher to pursue the information searching activity. Physical elements relate to availability of the physical resources and sources that facilitate access to

information (Choo, 2006). The model recognises three realms of experience that the information searcher engages in during the process of information-seeking: affective (feelings), cognitive (thoughts), and physical (actions) (Kuhlthau, 2004). Besides, information-seeking is not only a process of finding information, but also a process of constructing meaning.

Though the model has been applied in other settings such as the work place, various researchers mostly in academic settings have used it. For example, Vakkari (2001) used it in "theory and task-based information retrieval process; summary and generalisation of longitudinal study"; Heinstrom (2006b) used it in "fast surfing for availability or deep diving into quality: motivation and information-seeking among middle and high school learners". Byron and Young (2000) used it in "information-seeking in a virtual learning environment" amongst others. The results demonstrated that the students followed Kuhlthau's ISP model.

Kuhlthau's model assumes that information-seeking is a process of gradually refining a problem, where the information searcher needs information to accomplish the task. According to the model, the first phase of information searching is marked by feelings of uncertainty and ambiguity. However, things become clearer and more focused as the searching progresses. The information searcher also becomes more confident in his or her ability to search (Wilson, 1999). The six stages identified by Kuhlthau are:

***Task initiation*:** The searcher becomes aware of his or her need for information. S/he recognises the gap that requires information and at this stage s/he feels uncertain and apprehensive. The thoughts are around options that can be taken to pursue the searching process. Personal experiences and prior knowledge are brought to the fore (Kuhlthau, 2004).

***Topic selection*:** At this stage the information searcher starts to identify the topic for which information will be sought, he/she starts feeling optimistic about the topic and feels ready to start the search. The information searcher also weighs his/her options for

searching and selects the option that s/he believes will produce the most relevant information (Kuhlthau, 2004).

***Exploration*:** Here, seeking information begins and the feeling of uncertainty and confusion returns and increases. The information searcher searches for the general topic to get an understanding of it, and subsequently becomes more focused on the topic. This stage is considered the difficult stage of searching, as the information searcher comes across various information sources. The information searcher may feel overwhelmed, find the task daunting, and consequently decide to abandon the process. At this stage retrieved information often seems to be inconsistent with the topic. According to Kuhlthau, a lack of searching skill and a failure to communicate precisely what the need is may lead to communication failure between the information searcher and the system (Kuhlthau, 2004).

***Formulation*:** At this stage the searcher starts feeling confident, as he/she is able to formulate the problem that needs to be resolved. The feeling of uncertainty is reduced. The information searcher becomes more focused, more involved and more aware of what needs to be done, and starts moving in the direction where answers will be obtained. According to Kuhlthau, four criteria used to select a topic are likely to be used at this stage. She explains the four criteria as *task* (where the information searcher identifies what s/he is trying to accomplish), *time* (the identification of a time frame for completion of the task), *the identification of her/his interest* (the segment of the topic the information searcher has an interest in) and finally the *availability of the information* (what information is available concerning the topic and where to get it (Kuhlthau, 2004).

***Collection*:** Information relevant to the need is gathered at this stage. The information searcher becomes more focused and involved in the topic, and begins collecting and writing notes on more specific information. The interaction between the information searcher and the system becomes more effective at this stage. The information gathered is focused on the topic and only information pertinent to the topic is communicated to the system. There is a lot of interest in the topic and the feeling of uncertainty abates as confidence sets in (Kuhlthau, 2004).

***Presentation*:** This is the last stage of Kuhlthau's six stages of the information search process. Results of the search are presented. A feeling of relief and a sense of satisfaction are experienced if the search has yielded satisfactory results. However, if the search did not go as expected, satisfaction is replaced by disappointment. The information found, if relevant, will then be used for the purpose for which it was sought in the first place (Kuhlthau, 2004). Kuhlthau's information search process is illustrated in the figure 9 below.

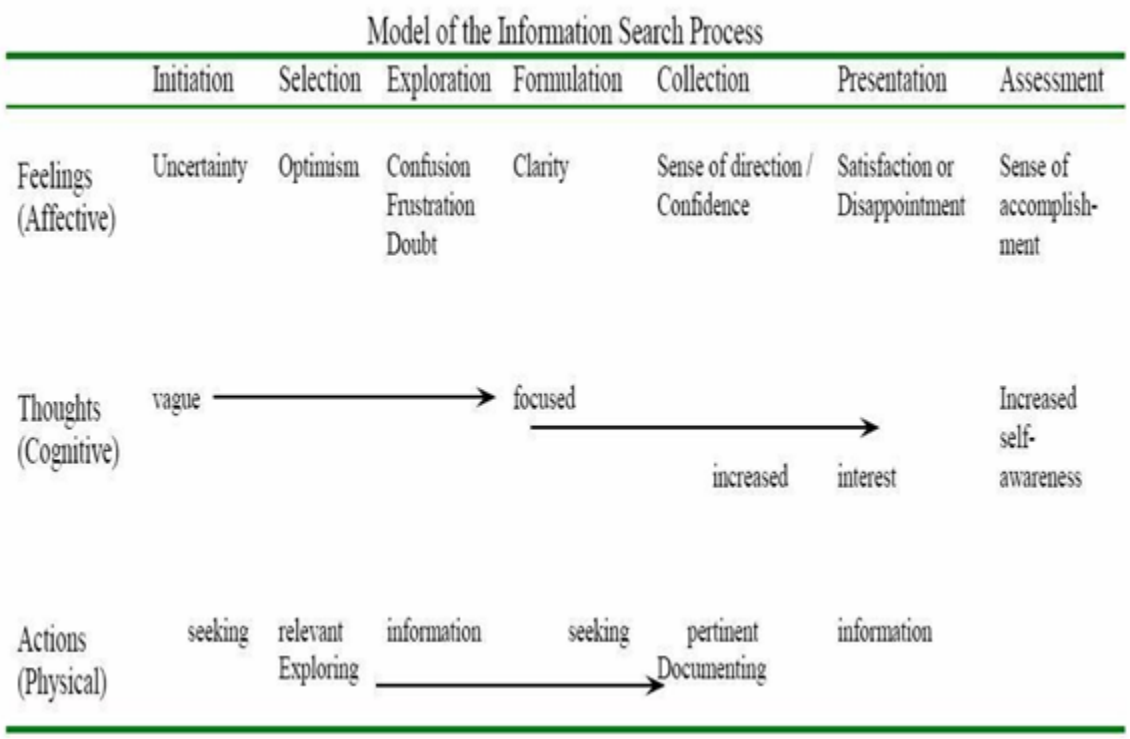

Figure 9: Kuhlthau's Model of the Information Search Process (Source: Kuhlthau, 2005, p31)

Kuhlthau is acclaimed to have done a good job by using a real life setting when observing students' information seeking. Students were observed while performing searches for tasks they were given at school. This makes Kuhlthau's model stronger than if the activities were carried out in an experimental research setting. Another strong point of the model is the fact that it takes into consideration the natural feelings students goes through when seeking information: cognitive, affective, and physical information is given. With

such information the library can better assist the student, knowing which stage of searching s/he is currently in. In addition, Kuhlthau worked with students at various levels and ages, making the model applicable to a large population of students (Navin, 2013); Though Kuhlthau is not explicit, she implies that there are barriers that are encountered in the process of searching for information.

The process ends its six-stages with the presentation of results. However, it is not clear what happens if those results are not what were expected. Kuhlthau makes no mention of the sources that are searched nor does she differentiate between sources. The model does not acknowledge the fact that the information source can be determined by various factors. While the model has been revised over the years and has been used to understand information-seeking by various information users, especially students at various levels of proficiency, it is not appropriate for this study. This study sought to gain an in-depth understanding of the information-seeking behaviour of medical doctors and professional nurses. Kuhlthau's model is a list of stages, and does not expound on information sources used by various groups of information users. Also the model's focus on longitudinal studies of students where it has produced similar results, make the model unsuitable for this study whose focus is professionals (doctors and nurses).

2.2.7 Meyer's Building Blocks of Information Behaviour (Source: Meyer, 2016)

Meyer (2016) joins the continuing effort by other researchers like Wilson as discussed above (2.2.1, 2.2.2. 2.2.3) to understand the seemingly complex information behaviour phenomenon. Meyer based her model on analogising various information behaviour studies in order to comprehend information behaviour activities entailed in those studies. While she believes that the parts identified by various studies as what constitutes information behaviour process are instrumental, she also believes that certain parts are missing. In addition she believes it was important to decipher the identified information behaviour components for the easy understanding by the novice researchers. Meyer then brought together the core information behaviour components to establish how they came

into being while she added other blocks she believes were missing and are essential in the information behaviour process. Figure 10 below illustrates building blogs of information behaviour as identified by Meyer.

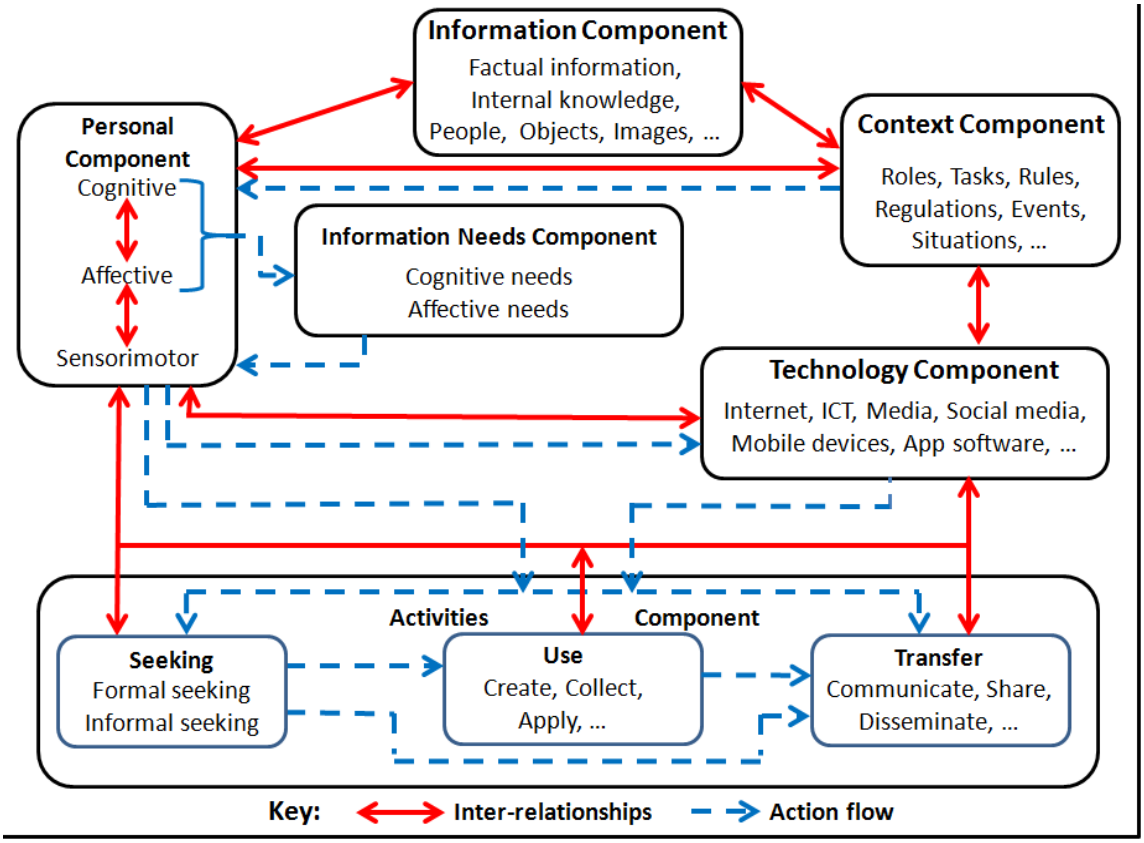

Figure 10: Meyer's Building Blocks of Information Behaviour (Source: Meyer, 2016)

In the above diagram, Meyer identified six components that contribute to information behaviour. The model goes further to untangle the components in order to extract their meaning.

***Information*:** Meyer posits that information is core in the information behaviour process as the end goal is to access "information". Despite being an important part in the process in actuality information behaviour researchers have made a little effort in in making this aspect explicitly enough. The model can be commended by bringing the aspect of

information to the fore. According to the model people, objects, sounds and images all form part of information sources.

Contextual component*:* As in Wilson' general mode of information behaviour, the model identifies the context in which people operate as having influence in information seeking. It is important to recognize that people live and work in various contexts and thus will behave differently depending on the context they are in. The quality and criteria of information needed will be determined by the context.

Personal components*:* The model identifies cognitive, affective and Kuhlthau**'**s physical component is replaced by sensorimotor components as personal components.

Information need*:* The interplay between the cognitive and affective components prompts the need for information. While other researchers recognise the information need component this model extends far by acknowledging the interplay of mental structure prior to the information need. For example in Wilson's first model of 1981 information is the stage in the information behaviour process.

Technology component: Technology is a strength of Meyer's model that recognises that technology may have a profound effect in one's competence and presence. The model identifies sources, resources, mobile technology and social networks tools as part of technology.

Activities**:** Depending on the decisions taken during the personal component, the person searching for information may engage in the actual tangible activities, which include seeking, using, and transferring for information.

Meyers' model represents comprehensive blocks of information behaviour and can be credited for identifying other paramount components of information behaviour that are missing in the earlier models such as information, personal and technological components. The untangling of the various components makes understanding of information behaviour straightforward. However the model missed a component that is important in achieving the objectives of this study, the "intervening variables" as noted by Wilson (1981) that may either support or hinder information seeking.

2.2.8 Leckie's General Model of Information-seeking Behaviour of Professionals (Leckie et al., 1996)

Leckie *et al.* replicated Poole's 1985 theories of middle range. Poole extracted what he called middle range theories to find common trends from library and information science studies in order to explain and predict information behaviour. According to Poole the theory was to mitigate the crisis found by other researchers in studies of library and information science due to the way the studies were developed. He felt they were not advancing theory but instead they were documenting isolated behaviours. In the same way, Leckie *et al*. (1996) based their model on a meta-review of studies of professionals that included engineers, health professionals, and lawyers. However, the reasons were different from those of Poole. The intention of Leckie and colleagues was to find common trends across all disciplines. According to Leckie *et al*., (1996) all professionals assume a number of complex and various work roles. The roles have tasks attached to them, and tasks for each specific role are likely to prompt specific information needs. There are always intervening variables that may either facilitate or inhibit the seeking and use of information by the information searcher. It usually takes more than one attempt to find relevant information. These findings acted as the impetus for Leckie *et al*. to develop a general model for the information-seeking behaviour of professionals.

The model suggests that it is through understanding work roles and their associated tasks that an understanding is possible of why, how, and when information-seeking takes place. According to the model, work roles and their associated tasks take place within a particular context, specific for a particular work position. Certain factors such as position in an organisation, years of experience and area of specialisation shape individual's information needs. The model contends that once the information-seeking process starts, intervening variables such as information source characteristics (for instance quality, cost, accessibility, format and awareness of information) will determine the success or failure of the information-seeking process. The model also identifies the "outcome" as the necessary last part of the information-seeking process. Outcome could lead to

information being put into use if it is relevant to the need. A feedback loop shows that the information searcher may repeat the process if more clarification is needed. Leckie *et al*. (1996) argue that despite the fact that the model is based on three professional groups, it could be applied to any professional group. They call it 'an original model of information-seeking'. Figure 11 illustrates the general patterns of information-seeking by professionals.

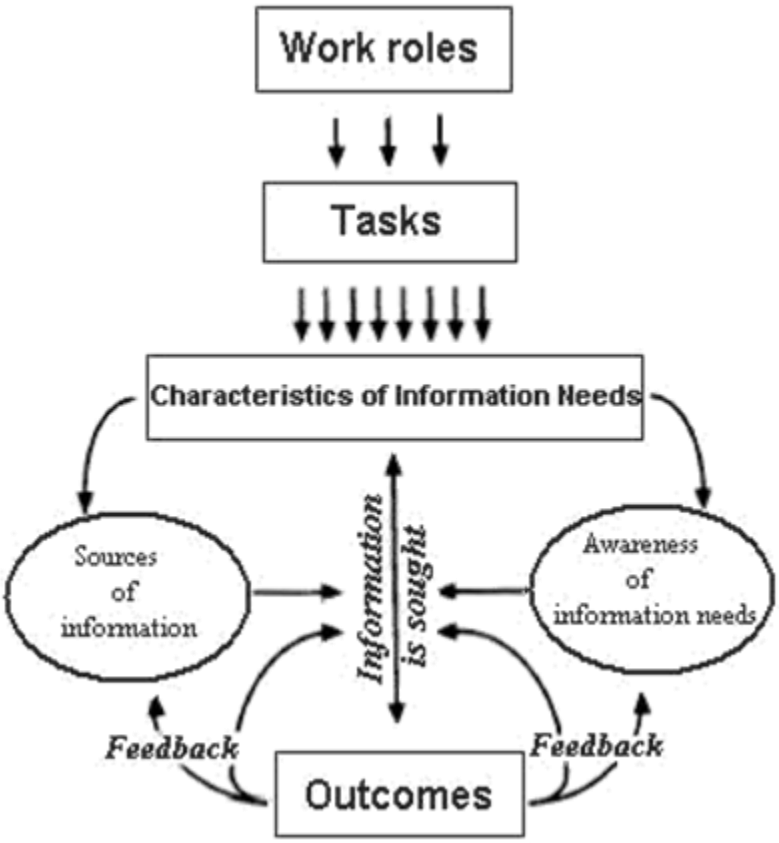

Figure 11: Leckie *et al*. 1996 General Model of Information-seeking of Professionals (Source: Leckie *et al*. 1996, p160)

2.2.9 Critical elements in Leckie et al. 1996 Model (Work roles, associated tasks, and information needs)

Leckie *et al*. (1996) described three elements of the model: work roles, associated tasks and information needs. According to the model, the role played by the professional in the workplace provides the basis for information needs. For example, for a doctor whose work role is "paediatrician", the daily tasks associated with this work role would be examining, diagnosing and treating children with a range of diseases as well as advising parents on how to take care of their children. These tasks associated with being a paediatrician are more likely to compel the paediatrician to seek information in order to carry out the tasks. This means that both tasks and information needs emanate from the work roles and the tasks determine the types of information needs.

Bystrom (1999) suggests that people perform different tasks that require information-seeking and searching for both working and leisure purposes. Several researchers have acknowledged the importance of focusing on work roles and tasks as a basis for understanding information behaviour. The only way to understand various ways and strategies that people use for information-seeking is to understand the tasks they perform, especially when the tasks are complex; the more complex the task, the more complex the information-seeking process (Bystrom, 1999; Bystrom & Jarvelin, 1995; Murtonen, 1994). Understanding tasks also assists in designing information systems that are suitable for specific groups of users and their work (Bystrom, 1999). Bystrom (1999) underlines the importance of three categories of information, which emphasise tasks: task information, task-solving information and domain information. Task information is the information required to accomplish a task, while task-solving information refers to the means and methods to perform tasks. According to Elsweiler *et al*. (2011), work tasks serve as a background framework through which information needs are detected, followed by information-seeking. Huvila (2008), on the other hand, posits that one way of explaining the context of information activities is to examine work and work roles, as it is not easy to conceptualise human information behaviour.

Leckie and her colleagues are not the only researchers who have used the notion of the "work role" and "tasks" as having influence on information needs. Other researchers

have also used these as a basis to understand how people look for information. Landry (2006) used Leckie *et al*.'s model to determine the effects of work roles on the choice of information sources by dentists. Fidel and Pejtersen (2004) used cognitive work analysis framework, which is a work-centred conceptual framework to design information systems. Wilson (1996) also refers to work role among other factors that influence information needs. More researchers continue to appreciate the task orientation approach on information behaviour research. Vakkari (2003) argued that few studies viewed information searching from the perspective of work role. Similarly, Jarvalin and Ingwersen (2004) proposed that information-seeking research must expand to include tasks. Belkin, Brooks and Oddy (1982) pointed out that information-seeking is a process based on work roles. Below is the conceptual representation of how professionals' work roles activate information needs:

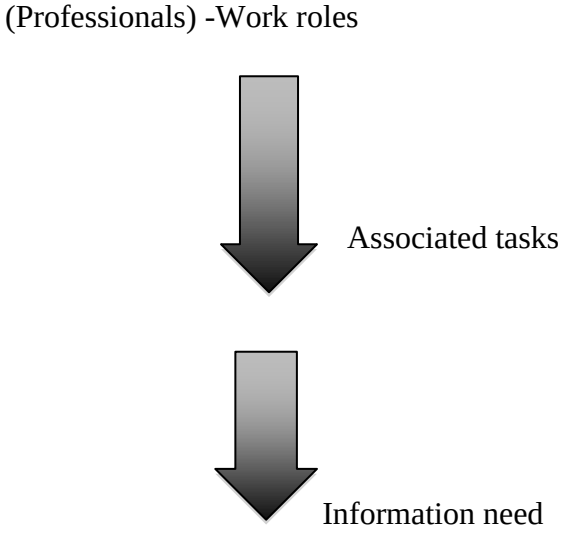

Figure 12: Professional work roles and information needs (Source: author).

2.2.10 The Professional feature in Leckie et al. 1996 General model Model of Information seeking of Professionals

There has been a keen interest in investigating the information-seeking habits of practitioners within the library and information science literature as well as within other

professionally-oriented disciplines (Leckie *et al*., 1996; Leckie, 2005). Due to this interest, numerous studies on the information-seeking habits of various professional groups have been conducted. Leckie (2005) asserts that investigating the information behaviour of professionals' positions within a certain context, makes it easy for the investigator. The practitioners whose information-seeking habits have been investigated include, among others, health work workers, engineers, lawyers and managers. In order to understand professionals, the first step is gaining an understanding of their professional work roles (Abbot, 1988). Devadason and Lingam (1997) state that understanding the information needs and information-seeking behaviour of numerous professional groups is vital to help with the planning, implementation and operation of information systems in the work place. Among the researchers who have researched the information behaviour of professionals are Ajuwon (2006); Alghanim (2011); Bennett *et al*. (2005); Bryant (2004); Jones, Schilling and Pesut (2011); and Lappa (2005). Among those who have investigated the information behaviour of engineers are Fidel and Green (2004); Freund, Toms and Waterhouse (2005); Grzywaczewski (2011). Some of the researchers who endeavoured in researching information behaviour of lawyers include Khan, Batti and Khan (2011); Leckie *et al.* (1996); Makri (2009); Wilkinson (2001). Other scholars such as Simard and Rice (2006), and Hirsh and Dinkelacker (2004) investigated the information behaviour of managers in various settings.

Leckie *et al*. (1996) referred to medical doctors and professional nurses as a group of professionals whose services are task-oriented and include numerous work roles such as managing, counselling, planning, supervising, researching, and providing expertise where it is needed. It can therefore be argued that with the variety of roles that medical doctors and professional nurses play, which include patient care, diagnosis, treatment, referrals, communication with patients and their families; and planning for patient treatment, among others, an understanding of the context of their profession is an important part of understanding their information behaviour. Cheuk Wai-Yi and Dervin (1999) suggest that information sources preferred by professionals differ from one another since their work involves managing different information domains. In this regard, Westbrook, Ampt,

Kearney, and Rob (2008) noted that medical doctors provide direct patient care, which includes diagnosis and treatment of patients; while professional nurses are more like soldiers, running around looking after patients and administering medication. Moreover, medical doctors and professional nurses devote hours to working in hospitals, their profession is undeniably information-intensive and thus their professional roles become the most important determinant of their information behaviour.

The strength of Leckie *et al.*'s model lies in its integration of information needs and the information-seeking studies looking at professionals. The model conceptualises information need as something driven by a goal (accomplishing of a task). Although there are other models that acknowledge task driven information-seeking, Leckie and colleagues are the only ones that linked the task driven information-seeking model to professionals. Leckie and colleagues associate the information needs of professionals with their work roles. The work roles of professionals act as a force for their information needs. The inclusion of the "outcome" illustrates that the information-seeking process has to end somewhere, which is the result to the information-seeking process. According to Leckie *et al*. the outcome contributes to the progression of the task if the information is satisfactory, for example producing a report.. However, if adverse information-seeking is repeated, which is illustrated by the "feedback loop". The model is derived from studies involving health professionals, including medical doctors and professional nurses. With this model Leckie *et al.* have tried to expand the hypothetical understanding of information-seeking behaviour among professionals, based on how professionals' information needs arise. Moreover, the model gives some perspective of how professionals choose information sources and what determines their choice in order to accomplish their work tasks.

The weakness of the model, however, lies in its focus on professionals only - their work role and their associated tasks - to the neglect of everyday, "person-in-the-street" information-seeking, which makes this model incomplete. Information behaviour outside of work is also an important sphere worth investigating, to understand how people use

information to deal with everyday personal problems. Another weakness is that the model regards professionals as one homogenous group that shares the same interests.

Leckie *et al.* suggest that their model is a general model that can be applied to study the information behaviour of any group of professionals. Unlike Wilson's model that has evolved over time since 1981, Leckie et.al have not made any major revisions to the model since its inception. However, the model has been applied in various studies. For example, Wilkinson (2001) used it to study information sources used by lawyers in problem solving. Leckie and Pettigrew (1996) used it to analyse the results of a study that determined the role of nurses in linking the elderly with community resources. It was also used to determine the information needs of decoy female police officers (Baker, 2004). The model has recently been applied in the South African context in a study of the information-seeking behaviour of engineers (Du Preez, 2008). Nevertheless, the points discussed above make the model more relevant for the current study than other models discussed above.

2.3 Summary

A number of researchers have endeavoured to develop models that explain how information is sought and used by various groups of users. Eight models were discussed above. They include Wilson's first and second 1981 Models, Wilson's 1996 Model, Wilson's 1999 Nested Model, Dervin's Model, Ellis's Model, Kuhlthau's Models and Leckie *et al*. 1996 Model. The chapter has focused on discussing these models with the intention of providing background to the choice of model that underpins this study. As demonstrated by the discussion above, there is no model that can be regarded as complete in its coverage of all the aspects in the information behaviour of professionals such as medical doctors and professional nurses. The models complement each other, as they tend to focus on one aspect of information behaviour rather than all. Some models such as Wilson and Ellis's information-seeking models are concerned with information-seeking. Others such as Kuhlthau are concerned with the information search process.

The current study was anchored in Leckie *et al*. 1996 General Model of Information-seeking behaviour by professionals. As with other models, Leckie and her colleagues' model cannot be regarded as complete. However, it incorporates major aspects that this study seeks to determine, such as information needs, information sources, information-seeking, and factors facilitating or hindering information-seeking amongst medical doctors and professional nurses of the OR Tambo Health District. In addition, Leckie *et al*. (1996) model is based on an observation of recurring patterns of information use by professionals, including engineers, health professionals, and lawyers. Wilkinson (2001) and Landry (2006) are some of the researchers who have validated the model. Wilkinson used the model to determine the information sources used by lawyers in problem solving, while Landry used it as a basis to discuss the information behaviour of dentists.

An ideal comprehensive information behaviour model would be one that incorporates all aspects involved when seeking information, such as information-seeking, information sources, intervening variables, information sharing, information communication, information use, as well as a recognition of the affective, cognitive and physical elements of information seeking. The feedback loop is also necessary to illustrate that the information-seeking process may continue if the need is not satisfied until the right information is found. Yitzhaki and Hammershlag (2004) suggest that the feedback loop could go back as far as is necessary, and that work roles, tasks and information needs could be redefined as the search continues, using different search strategies.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter presents both empirical and theoretical literature based on the research questions, theoretical framework and broader issues around the research questions. The literature reviewed is obtained from books, journals, technical reports, conference proceedings, and more. It covers roles and associated tasks of medical doctors and professional nurses within the hospital setting, information needs of medical doctors and professional nurses and how they use information, how medical doctors and professional nurses look for information to perform their tasks, and factors that facilitate or hinder information seeking of medical doctors and professional nurses. Gaps in literature are isolated and how this study addresses them adduced.

The empirical and conceptual literature reviewed in this chapter is obtained from books, journals, theses, conference proceedings, databases, and more. Kothari (2004) points out that there are two types of literature – conceptual literature concerning the concepts and theories, and empirical literature, which discusses studies related to the variables of the current study. This chapter is organised around the research questions, key variables of the underlying theory and broader issues beyond the research problem. Thematic areas from the research questions include information needs of medical doctors and professional nurses; information-seeking behaviour of medical doctors and professional nurses; channels and sources of information used by medical doctors and professional nurses; and factors that facilitate or hinder information seeking of medical doctors and professional nurses. In addition, key variables from the underlying theory are professionals, work roles, and tasks; characteristics of information sources; awareness of information; and information-seeking outcomes. Moreover, broader issues around the research problem include information needs, information seeking, and information

sources. Within each theme, the international context is reviewed, followed by regional and local contexts.

Medline Plus (n.d) defines medical doctor, as a person licensed to practice medicine, while a registered nurse or professional nurse is a person licensed to practice nursing. Various people utilise sundry nomenclatures to refer to doctors. In the United States of America (USA) and Europe and in some African countries like Tanzania, Nigeria, a "physician" is the nomenclature normally used to refer to all those practising medicine, while in South Africa the common term is "doctor" or "medical doctor" to distinguish from those who have advanced their knowledge in a certain field and obtained a PhD. When incoporating all those who are in the medical field, "health professionals" and "health workers" are normally the terms used. It must be noted therefore that these terms will be part of this literature review. The study investigates the information behaviour of medical doctors and professional nurses from selected hospitals of OR Tambo Health District in the Eastern Cape Province.

3.2 Information behaviour

Spink and Cole (2001) remarked, "For millennia humans have been seeking, organising, and using information as they learned and evolved patterns of human information behaviour for resolving problems related to survival, work, and everyday life". Information behaviour is embedded in human life as a survival means, whether for work or social life.

Bates (2010) stated that the history of information behaviour emanates from the founding years of professional librarianship in the United States around 1876. At the time libraries in the United States took an undertaking to serve and care for their library users. Since those early days, the information behaviour concept has gone through a transition, having adopted several names such as user studies, studies of information seeking and gathering, studies of information needs and uses, and information seeking research. It was during

the 1990s that the term "information behaviour" came to wide use, focusing on how people find and use information (Bates, 2010).

At the same time, researchers started showing an interest in writing about information behaviour; and 1948 marked the emergence of information behaviour studies, when a number of papers on information behaviour were presented at a Royal Society Scientific Information Conference (Wilson, 1999). Since then, there has been a tremendous interest in the subject and this has created an abundance of information behaviour studies of various groups of information users, including medical doctors and professional nurses. Wilson (2000) refers to 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". Case (2007) states that information behaviour activities such as information need, choosing, finding, and using information are basic to human existence. Spink (2010) noted that information behaviour encompasses multitasking of behaviours. Moreover, Solomon (1997) states that an understanding of information behaviour is a way of understanding complexities in the field of information.

The inclusion of the term "totality" into the definition of information behaviour by Wilson is an indication of the broadness of the concept of information behaviour. This illustrates that information behaviour encapsulates many facets, which are significant to an understanding of information behaviour. Information behaviour is an activity that can be purposefully initiated, but can also happen passively (when a person finds information without actively looking for it). Information behaviour is also an activity that can be done by an individual to fulfil a set of goals (Reddy & Jansen, 2008). According to Foster (2006), information behaviour can be a collaborative effort (when a group of people may look for information to fulfil a common goal). Another distinguishing factor of information behaviour is that it is embedded in tasks (people engage in information behaviour to accomplish a particular task in a real life context). Moreover, Spink and Heinstrom (2011) proposes that it is not only work-related tasks that involve information behaviour; information behaviour can be undertaken to fulfil leisure activities, too. As

part of human existence, humans are involved in information-seeking behaviour of some sort.

Though the definitions of information behaviour are a testimony to the wide scope of the concept that is concerned with a myriad of activities, studies concerned with information behaviour rarely integrate all the facets of information behaviour, despite being voluminous. Even though Wilson described information behaviour as a totality of human behaviour, his models of information behaviour do not demonstrate such a totality. More information behaviour studies are needed that would cover all activities and behaviours that encompass information seeking. An ideal, comprehensive information behaviour model would be one that incorporates all aspects involved when seeking information, for example, information-seeking, information sources, intervening variables, information sharing, information use, as well as a recognition of the affective, cognitive and physical elements of information seeking.

3.3 Concept of information and its importance for medical doctors and professional nurses

The importance of information in anyone's life cannot be over-emphasised. "According to Chen and Harnon (1982), all humans need information at some point in their lives; whether to have an answer to a question, to locate facts, or have some general understanding. Information is at the core of information needs and information seeking. It is for this reason that an understanding of the information as a concept is vital for an understanding of information needs and information-seeking of medical doctors and professional nurses. In the process of information seeking, the ultimate goal is to get information in order to meet the information need. Dresang (2005) defines information as ideas or thoughts that individuals contribute, seek, or obtain from informal or formal discussions, investigation, or study. It is data that has been processed and is capable of answering the user's query and can assist him or her in decision-making (Ajiboye & Tella, 2007).

In addition, Prasad (2000) argues that there is no field of human activity where information is not needed. The effectiveness of the activity is dependent on the availability of information at the right time, at the right level and in the right quantities. The Medical Library Association (1995, p4) gave a picture of the significance of information in patient care by saying:

> *"*Society is concerned about access to high-quality health care at reasonable cost. Increasing numbers of health care leaders recognise the importance of information to excellent affordable health care. Clinical decisions should be based on the scientific evidence, traditionally recorded in the health sciences literature. The development and use of evidence-based practice guidelines demand a sophisticated analysis of the literature, creative ways of delivering information to practitioners at the point of care, and an understanding of the effect of information on practice patterns and costs. There is a growing need for computer-based patient record systems that can generate new scientific knowledge as a by-product of current care."

The World Health Organisation (WHO) (2004) point out that equitable and universal access to health information is the best strategy to minimise global gaps in health and to achieve the health-related millennium goals. Andualem *et al*. (2013) posit that information is vital in the lives of health professionals for the improvement of any country's health goals. Case (2007) contends, "All people do seek information, yet for some people and in some situations the stakes are much higher". For medical doctors and professional nurses, the stakes are clear as they deal with people's lives and nothing can be more important than seeking and accessing information that can save lives of the patients of medical doctors and professional nurses. Having access to quality information at their fingertips can make the difference between inferior health care and high quality health care. Therefore, medical doctors and professional nurses need to have access to the most reliable and up-to-date information. Health goals can only be achieved if based their

work on evidence-based practice. Titler (2008) describes evidence-based practice as an industrious use of current evidence for decisions pertaining to patient care.

For many years concerted efforts have been made to improve health care and health outcomes globally, with the WHO driving many initiatives towards such improvements. In recognition of the role of information on health professionals' lives, various initiatives in the United States of America were developed to ensure that health professionals are able to access information. Examples of such initiatives include Standards for Hospital Libraries, the Statewide Electronic Health Library, and clauses about the necessity of a library and librarian within hospitals in the Joint Commission on Accreditation of Health Organisations (JCAHO) and open access initiative. In 2002, standards for hospital initiatives in North America included standards for health libraries, developed by the Medical Library Association. The standards are evaluated to make sure they tally with the evolving information needs of health professionals. The current version of standards was revised in 2007. The standards are a guide for hospital librarians and administrators on what is expected of them in the provision of quality information for health professionals. Aspinal, Chew, and Paker (2009), from the University of Minnesota Health Science Library, recognised that health professionals need evidence-based information for treating their patients. They implemented a statewide electronic health library based on needs assessment that would provide health professionals with suitable quality information. It is estimated that 160000 health professionals including 40000 students are benefiting tremendously in terms of getting up-to-date information (Aspinal *et al*., 2009). In another initiative, Paradise (2004) called for the inclusion of a clause about the necessity of a library and librarian within hospitals in the Joint Commission on Accreditation of Health Organisations (JCAHO). He argued that the absence of a library and a librarian within the hospital is detrimental to patient safety. The availability of a library and a librarian could prevent unnecessary mistakes by health professionals. Medical librarians working from hospitals would be helpful for searching and evaluating information to determine the risks of certain drugs. The increasing use of new technologies also requires the services of a librarian as an intermediate between

technology and health professionals. In addition, libraries in hospitals are also needed to house evidence-based information for practicing evidence-based medicine (Paradise, 2004).

Farrell and Rhodes (2011) suggest that information has the power to save lives, and started an initiative that promotes open access. According to the authors, the high costs of medical journals are a hindrance for many health professionals. The cost of these journals prevents their access to the information they need to save lives, and open access is viewed as a solution to the problem. The Cochrane's collaboration (1993) was established as a response to the reality of the difficulties associated with access to high-quality information for health workers. It comprises an international network of more than 28000 dedicated people from over 100 countries, and is a partnership of mixed experts from the field of medicine. Their responsibility is to provide information about health care through the Cochrane Library. Information is provided for health care providers, policy-makers, patients, their advocates and caregivers, so that they make well-informed decisions about the care of their patients, based on the best available research evidence. The Cochrane collaboration is used internationally as the benchmark of high quality information for health professionals.

Atani and Kabore (2007) posit that inequalities in health care services bear a direct link to inequalities in information access. To respond to the need for information for health professionals in the African continent, the WHO regional office for Africa introduced the Africa Index Medicus for Health Information and Libraries in Africa. Africa Index Medicus is a database of biomedical information and literature generated in Africa. This initiative is meant to improve access to information resources related to health in Africa. It is also meant to increase the visibility to health and biomedical research done in Africa for the benefit of health professionals.

3.4 Information needs

A need for information is presumably the first stage of information seeking. However, as Wilson (2005) points out, not all information needs lead to information seeking, due to barriers that might exist during the process**.** Several researchers including Thompson, Cullum, McCaughan, Sheldon, and Raynor (2004); Wilson (1981); and Wilson (2005) argued that it is not easy to explain the concept of information need, as it is not observable. Information need is generally driven by other needs, and it is vital to explain the information need according to the context of what is being investigated at a particular point in time. The dilemma in defining "information need" is attributed to the complexity and numerous definitions of the term "information" itself (Wilson, 2000). Wilson concedes that researchers have proposed several definitions of information. However, there is lack of progress in designing a single definition that can be used in the information science field.

This dearth of development is due to a failure by researchers to use the definition of information at the level of the investigation of information need (Wilson, 2000). Wilson (2005) even suggests that the concept of "information need" should be abolished and instead be replaced by the concept "information-seeking behaviour", as the behaviour is observable. The needs are subjective - what people believe they need is subjective to their understanding of the need and might not be experienced as a need by others (Wilson, 2005). Furthermore, Wilson (2006) points out that it is also difficult to separate information needs from wants, expressed demands and satisfied demands. Wilson (1981) suggests that information needs are not fundamental needs but rather secondary needs that are motivated by more basic needs such as physiological needs (need for shelter, need for food). Despite the quandary in defining the term information need, Case (2006) conceptualises information need as recognition of the gap that exist in one's knowledge base. According to Wilson (1981), the need for information is task-embeded; and the task to be performed motivates the searcher to look for information. Kim (2008) suggests that tasks may include the searcher's professional acivities (patient care in the case of medical doctors and professional nurses), educational activities, research activities and recreational activities, among others.

Devadason and Lingam (1997) suggest that understanding the information needs and information seeking of various professional groups is fundamental in the planning, implementation and operation of information systems in work settings. Similarly, Zhang (1998) posits that understanding information needs and information-seeking behaviour is vital to the provision of successful information services.

Information need is not an easy thing to express, as only the person feeling the need can understand the depth and nature of the need. However, it is clear that information need is associated with the identification of a gap in one's knowledge. Regardless of the complications, understanding one's information needs is important as it informs the provision of relevant information.

3.5 Information-seeking behaviour

Kingrey (2002) suggests that information seeking is frequently used as an umbrella term covering a set of related concepts and issues. Ikoja-Odongo and Kigongo-Bukanya (2004) noted that seeking information is a basic activity that all people engage in and that it manifests itself through a particular behaviour. Singh and Satija (2006) point out that information seeking is situational but to a large extent its importance lies with the individual who is seeking information. The information searcher's personality, which encompasses thoughts, feelings, strategies used for searching, attitudes and anxieties, among other things, are more likely to influence the information-seeking behaviour of each individual searcher (Singh & Satija, 2006). According to Shanton (2003), information-seeking behaviour should be understood in terms of the context in which the need to seek information has risen. Shanton believes that information need and information seeking will always be intertwined. According to Wilson (1981), the need for information is task-embeded; and the task to be performed motivates the searcher to look for information. Kim (2008) suggests that tasks may include the searcher's professional acivities (patient care in the case of medical doctors and professional nurses), educational activities, research activities and recreational activities, among others. Kim (2008) further suggests that to understand information seeking there is a need to understand the

context within which the search takes place.

Several researchers define information seeking in different ways. Case (2000) refers to information seeking as a process motivated by the gap in one's knowledge which leads to consciously seeking information to close that gap. Wilson (2000) refers to information-seeking behaviour as "purposively seeking information as a consequence of a need to satisfy some goal. In the course of seeking, the individual may interact with manual information systems such as a library or newspaper and/or computer-based systems like the world wide web." Vakkari (1999) simply defines information seeking as a method of searching, acquiring, and using information. Marchionini (1995) suggests that information seeking comprises sub-processes such as problem recognition (acknowledging that there is a problem that needs to be solved); problem definition (identifying the nature of the problem which helps in identifying sources needed to sort out the problem); search system selection (identifying the information finding strategy) query conceptualisation (trying to understand the query); query formulation and query execution; including starting with the search process; examining the results of the search process; and repeating these sub-processes if the results suggest this is necessary.

The definition of information-seeking behaviour illustrates the myriad ways that people use when searching for information. It demonstrates that seeking information is not circumscribed in any way but is determined by the circumstances that people find themselves in at a particular time. Information-seeking behaviour includes all actions, strategies, and conduct employed in the pursuit of information, the primary objective of which is to meet an information need. The information seeking process is also influenced by the context in which the need for information emanates.

3.6 Information needs of medical doctors and professional nurses

According to Khayesi (2011), an information need arises when the knowledge that a person has to solve a certain problem is not adequate. That lack of knowledge triggers the need to search for information to solve the problem. Furthermore, how people seek

information, the strategies they use to locate it and how they use information once they have it is influenced by various factors such as social, technological and economic factors, amongst others (Khayesi, 2011).

The Royal College of Nursing, (2003) defines nursing as "the use of clinical judgments in the provision of care to enable people to improve, maintain, or recover health, to cope with health problems, and to achieve the best possible quality of life, whatever their disease or disability, until death". The Australian Institute for Health and Welfare (2017) refers to a medical doctor as a person whose primary employment role is to diagnose physical and mental illnesses, disorders and injuries and prescribe medication and treatments in order to promote or restore good health.

Thompson (1997) believes that the knowledge held in a doctor's head is not enough to answer all the clinical questions that arise in a typical day's work. This means that medical doctors risk patients' health if they do not consult sources; knowledge is constantly evolving and doctors are required to keep abreast of developments. Pillay (2004) concurs, saying that health professionals need to continuously develop themselves in order to better treat their patients using the best available evidence. Similarly, the Nursing and Midwifery Council (2011) contends that all practitioners have a professional obligation to ensure that their skills and knowledge are always up to date in order to base their decisions on the evidence of research.

For health professionals to be able to deliver good quality care, it is critical that they have access to various information sources that are relevant to their work (Hansen & Wood, 2011). In addition, Ndosi and Newel (2010) postulate that the administration of medical care requires that health professionals have access to information that is reliable and up-to-date. Gorman and Helfand (1995) identified two factors that would motivate medical doctors to seek information; the urgency of the patient problem and the conviction that answers to a particular problem are in fact available.

Carrion, Woods and Norma (2004), for their part, are of the view that nurses constitute a

large proportion of health care workers but their information behavior has not been researched as widely as that of medical doctors. The role of nurses in patient care is a critical one. They spend more time with patients than doctors do, and are usually at hand when sudden emergencies arise in hospital; it is therefore critical that they have access to information that is fast and efficient. Understanding professional nurses' information needs would assist in the provision of information that is tailored to their needs so that they provide the best care possible for their patients.

According to the results of a study entitled, *Information needs and information seeking behaviour of professional nurses conducted at the Obafemi Awolowo University Teaching hospital, Nigeria*, nurses need current information (Ajayi, 2005). While Adanigbo (2006) found out that the majority (95%) of nurses needed information to keep up to date on issues related to their profession, Jones *et al*. (2011) postulate that the act of caring for patients, which encompasses the whole process of patient recovery, activates information seeking by nurses. Jones *et al.* add that the activation of the information need may be triggered by the need of a patient or the need to answer a query made by the patient's family.

A study by Oduwole (1998) on the information needs of medical doctors in teaching hospitals in Nigeria demonstrated that medical doctors needed information concerning patient care, which included information on drugs and diagnosis. The study also revealed that medical doctors needed information for research.

Gatero (2010), in a study entitled, *Utilisation of ICTs for accessing health information by medical professionals in Kenya*, revealed that the most prominent factors stimulating the information needs of medical doctors included patient care, a need to update themselves to keep abreast of current medical practices and information on clinical governance.

Coumou and Meijiman (2006) argues that medical doctors generally encounter about 400 diseases on a daily basis, and rarely have direct producible knowledge at the time of treatment for rare diseases and special problems. In addition, Thompson (1997) argues

that the knowledge doctors have accumulated over the years, which constitutes their knowledge base, is not enough to deal with all the medical problems they are confronted with in the course of their professional lives. Besides, information needs of medical doctors and professional nurses may also involve access and use of medical technologies for medical procedures, which is more likely to demand additional competencies on how to handle new technologies (Andualem *et al*., 2013). Andualem and colleagues also note that access to information helps to build one's knowledge base, and a strong knowledge base is necessary when practicing evidence-based medicine. Medical doctors and professional nurses, deal with people's lives; and how they apply knowledge in their treatment may well determine if a patient lives or dies. It is therefore expected that for the benefit of the patients, medical doctors and professional nurses have access to quality information to support their professional practice.

It is imperative therefore that they have access to information that is reliable, up-to-date, relevant, and available when needed. The information needs of medical doctors and professional nurses have to be understood in order to provide information services relevant to them as information users. Medical doctors and professional nurses are confronted with various challenges in their day-to-day to day work, which involve diagnosing, treating, and the general management of patients suffering from various kinds of conditions. Medical doctors and professional nurses therefore, need to access the latest information in order to cope with their work and provide quality services for their patients. Smith (1996) concedes that doctors tend to rely on the information in their heads when seeing patients, but the information may be outdated and wrong and cannot be trusted to deal with uncommon patient problems. Medical doctors and professional nurses therefore cannot practice quality patient care if they rely on information in their heads to answer patient care related questions. They need to access the latest information in order to provide quality patient care.

Several researchers utilising different methodologies and different sample sizes have endeavoured to research the information needs of various health professionals. Among

the researched groups of health professionals, medical doctors and professional nurses are the most prominent. Various studies have concluded that medical doctors and professional nurses need information in order to provide quality patient care. The evidence from the literature in both developed and developing nations as well as rural and urban settings suggests that daily clinical needs are a noteworthy reason for the information needs of medical doctors and professional nurses. This is confirmed by Lappa (2005) when she revealed in her study of the information needs of doctors in an emergency unit that 100% of respondents needed information for patient care. There is also evidence that information is not only needed for patient care, but its impact on patient care has generally been positive (Weightman & Williamson, 2005).

Wakeham (1993) noted that nurses' roles have evolved since the early days of nursing when nurses were secluded, with very little opportunities to discover alternatives in patient care. With technological advancement, changes in attitudes, economics and demography, nurses, like doctors, are required to be informed. Consequently, nurses have become aware of their information needs and the importance of using information for their patients. Although the general understanding is that medical doctors and professional nurses need information related to patient care, their needs do not follow the same taxonomy. Some distinct differences are identified between the two groups. In a survey of the information needs and uses of Thai nurses, Cheng (2004) found that although doctors and nurses needed information for patient care, questions posed by doctors were more clinical than those posed by nurses. Furthermore, the study revealed that variables such as level of education and experience affected the information needs of both doctors and nurses. The higher the level of education and years of experience, the easier it was to describe a situation or problem needing information for both doctors and nurses. French (2006), in his study exploring uncertainty and information needs in nurses in the United Kingdom, noted that nurses have difficulties in identifying and articulating their information needs. It could be assumed that those with fewer years of experience and a lower educational level lack the skill and knowledge to look for information in order to satisfy their needs.

Similarly, Spanceley, Leary, Chizawsky, Ross, and Estabrooks (2008), in a literature review of information sources used by nurses in Canada, point out that nurses' information needs are determined by their personal characteristics such as level of education and years of experience. The authors added that even when nurses work in the same setting and have the same information needs, the way they seek information varied according to their experience and level of education. Jones, Schilling, and Pesut (2011) carried out a study on barriers to and benefits associated with nurses' information seeking in the United States of America. The results demonstrated that nurses need information for various reasons, including professional (information needed for patient/caregiver/family member) and personal reasons.

Several studies of the information behaviour of doctors concur on one point; doctors mostly need information related to patient care. Studies on the information needs of doctors from the earlier to more recent studies concur that doctor's information needs are activated by patient care. Bryant (2004) conducted a study on the information needs and information-seeking behaviour of doctors in the United States of America Bryant discovered that doctors are prompted to seek information by a variety of needs arising from their professional responsibilities. Bryant categorised information needed by doctors as; information for the clinical care of individual patients (where information is sought to address questions arising from the diagnosis and therapeutic management of particular cases), information to keep up-to-date with developments in the health sector, information to explain to patient's various risk factors and lastly, to be informed on pharmacological information. Similarly, Bennett *et al*. (2004) undertook a study to determine the information behaviours and reflective practices of doctors in the United States of America. Information results revealed that information was needed for specific patient problems; and to get the latest research on specific topics. As in Spanceley *et al.* study regarding nurses' information sources, Bennett and colleagues also found that variables such as age and gender impacted on the information seeking of doctors. Younger, female doctors were found to be more likely to need information on specific patient problems. Similarly, results were also noted by Cheng (2004) in Hong Kong in a

study of clinical questions posed by hospital clinicians-including medical doctors and professional nurses.

Maggio *et al*. (2014), utilising semi-structured interviews, studied the information needs of doctors at the point of care in the United States of America and Netherlands. Maggio and colleagues identified six categories of information needed by doctors that included; refreshing, confirming, logistics, teaching, generating ideas, and personal learning. Though the study did not explicitly refer to patient care, it was suggested that the first three categories - refreshing, confirming and logistics - refer to information required for patient care. Davies (2007) and Younger (2010) both performed a literature review on doctors and nurses' information needs in the United Kingdom and the Netherlands respectively. The results from both studies demonstrated a need for information to support decision making in patient care.

Similarly, studies conducted in rural parts of the United States of America found that doctors and nurses needed information related to patient care. Dee and Blazek (1993), through interviews and an observation study, found that 75% of patient care questions were on treatment, 14, and 7% on diagnosis while information was also needed for psychological aspects of diseases. The results were supported by Dorsch (2000) through an analysis of existing literature on information needs of rural health professionals; and by Reddy and Spence (2008) when they observed the information needs of a multidisciplinary patient care team. However, Dorsch (2000) also noted that while the information needs and practices of rural health practitioners are similar to those in urban areas, the barriers to accessing information differ. Rural health professionals are impeded by isolation, lack of library services, lack of information-searching skills, and lack of internet access. Andualem *et al*. (2013) share the same conclusion, based on their study of the information-seeking behaviour of health professionals working in public hospitals in Ethiopia. They found that information needs and information-seeking behaviour of doctors and nurses in rural areas differed from those working in urban areas because of

disparities in the provision of information sources, especially the internet and online resources (Andualem *et al*., 2013).

Jones *et al*. (2011) and McKnight (2006) noted that nurses, as the largest group among health professionals, have a huge amount of responsibility, requiring constant surveillance of patients, whilst following doctor's orders. Salantera, Eriksson, Junnola, and Lauri (2003) identified some differences in nurses and doctor's information needs. The authors suggested that although nurses and doctors share a lot of information, they apply different approaches to problem solving. Salantera and colleagues added that doctors are able to identify their patients' problems, while nurses find it difficult to identify patients' problems. Xu *et al*. (2005) conducted the information needs and information-seeking behaviour of nurses in three inpatient acute care settings in the United States of America showing that nurses needed information for protocols and procedures. Similarly, Cogdill (2003) pointed out that nurses needed information related to drug therapy and diagnoses, and that they mostly consulted colleagues and protocol manuals. Thomas (2012) did a case study of the information needs and information-seeking behaviour of nurses at a university trust hospital in Britain where drug therapy, policies and procedures were found to be the reason for nurses to seek information. Leckie *et al.* (1996) posited that nurses seek institution-based information and spend a lot of time tracking reports, equipment, locating hospital policies, and gathering information related to patient admission, transfer, and discharge.

The roles and positions of doctors and nurses impact on their information needs. Turner *et al.* (2008) conceded that nurses' information needs are determined by position and role. The results are congruent with a study by Koch *et al.* (2012) where they asserted that due to the complexity and severity of patients' conditions, nurses working at ICU needed integrated information at the point of care. Reddy and Dourish (2002) conducted a study on the information needs and information-seeking habits of medical professionals (doctors, nurses and pharmacists) working in the Surgical Intensive Care Unit (SICU) in a metropolitan teaching hospital in the United States of America; and demonstrated that

SICU staff's information needs and information seeking are determined by their work activities or work rhythms.

With the prevalence of the internet, various studies of information behaviour have investigated information seeking on the internet. These studies came to the same conclusions that doctors and nurses search the internet for information related to patient care. Younger (2010), in his study of internet based information-seeking behaviour amongst doctors and nurses, demonstrated that health professionals' internet use is primarily for the purpose of finding information related to patient management and their own continuous professional development. Similarly, in Jones *et al.*, (2011) study, professional reasons were ranked first in a list of nurses' reasons for searching the web, followed by personal reasons, technology reasons, and organisational reasons. Lappa (2005) conducted a study of the information needs of emergency care physicians to inform the role of the clinical librarian. Just like many previous studies conducted on the information needs of physicians, this one found that clinicians (100%) needed information to treat patients. They needed special quick referral information to treat individual patients, to decide on drug dosages, and to help with diagnoses. The growth in medical knowledge and rapid advances in technology demands that physicians have constant access to up-to-date information. However, the results of Lappa's study established that physicians working at the emergency care unit do not search for information related to patient care due to extreme time constraints. The services of a clinical librarian are essential in facilitating provision of information to doctors in the emergency unit. Clinical librarians should provide evidence-based information at the point of care, saving physician's time (Lappa, 2005).

Alghanim (2011) found that no major difference existed between urban and rural doctors in relation to their information needs. Alghanim carried out a study on the information needs and information-seeking behaviour among urban and rural primary care physicians in Saudi Arabia. Both urban (80.8%) and rural doctors (81.6%) and nurses needed information to make decision about their patients. In-depth interviews were conducted by

Turner *et al*. (2008) on information needs of public nurses in rural United State of America where nurses were found to have numerous needs owing to their different roles and positions. Similarly, Ogbomo (2012) carried out a study of information needs of rural health professionals in Nigeria and found that in a range of information needs of health professionals, from highest need to lowest, related to treating certain diseases. Dorsch (2000) also concluded that health professionals needed information for patient care, through reviewing existing literature to determine information needs of rural health patients. Patient care measured an information needs impact of 27-79%.

Although information behaviour literature is vast in other parts of the world, studies that relate to any aspect of information behaviour, be it information needs, information seeking or information sources, are scanty in Africa. Such studies have been done only in Nigeria, Uganda, Malawi, Tanzania, and Kenya. Comparatively, more studies were conducted in Nigeria than anywhere else in the African continent, by researchers such as Ajuwon (2006); Nwagwu and Oshiname (2009); Ocheibi and Buba (2003); Ogunyade and Obajemu (2006); Shabi *et al*. (2008) summarized in table 1. Moreover, the studies in Africa concentrated mainly on medical doctors. The findings of these studies are congruent with studies conducted in other parts of the world; they agree that making decisions about patients activates the information-seeking behaviour of health professionals. However, the differences of these studies when it comes to the African context are the many obstacles that stand in the way of access to information -such as geographical, economical, and personal barriers (Dee & Blaze, 2003). Most of the studies carried out in Africa used survey questionnaires, which limit the value of the studies in terms of new generated knowledge.

Notwithstanding the dearth of information behaviour studies in the South African context as noted in chapter 1 (section 1.3, p.20), studies to determine the knowledge levels of health professionals in specific healthcare fields have been done in various areas of South Africa. The results of all these studies reveal that many healthcare professionals in South Africa lack adequate knowledge of their areas of specialisation. Therefore, it may be

concluded that medical doctors and professional nurses in the OR Tambo District and indeed in the rest of South Africa, just like their counterparts in the rest of the world, need access to information for patient care. Examples of the South African studies done include one carried out to determine breastfeeding knowledge among health workers in rural Mtubatuba in KwaZulu-Natal, South Africa (Shah, Rollins & Bland, 2005); a study to evaluate the clinical management of severely malnourished children in two rural Mount Frere hospitals in the Eastern Cape, South Africa (Puoane *et al*., 2001); and a study investigating health workers' knowledge and practices regarding leprosy care and control at primary care clinics in the Eerstehoek area of Gert Sibande District in Mpumalanga Province of South Africa (Ukpe, 2006). Based on the results of these studies, which demonstrated a lack of knowledge in doctors and nurses, the inductive conclusion would be that information is needed to close this gap. Medical doctors and professional nurses are compelled to respond to the modern explosion of medical knowledge. The volume of medical literature being published requires that medical doctors and professional nurses must keep updating their knowledge. Wyatt and Sullivan (2005) pointed out that the amount of medical information doubles every 20 years, while Naidoo *et al.* (2010) added that medical knowledge increases fourfold during the professional lifetime of health professionals. This rapid increase in information alone implies that medical doctors and professional nurses need to update their knowledge consistently, in order to keep up to date with new developments in their field.

Besides patient care, health professionals are expected to be knowledgeable in order to contribute effectively to achieving the country's goals of improving the welfare of its citizens. Godlee *et al.* (2004) pointed out that comprehensive access to information for health professionals is a requirement for achieving Health Information for All 2015 (HIFA 2015); as well as meeting the Millennium Development goals and successor Sustainable Development Goals. Millennium development goals refer to the eight goals that all United Nations member states, including South Africa, committed themselves to achieving by the year 2015. Out of the eight goals, three relate to health related problems, such as reducing child mortality, improving maternal health, and combating

communicable diseases such as HIV/AIDs and malaria. To attain these goals, medical doctors and nurses need to have access to the latest information that will inform their decisions. HIFA (2015) advocates for global access to information for all health professionals by the year 2015.

In Africa, access to information is seen as a weapon to combat HIV/AIDS, TB and malaria, diseases that have ravaged the African content. Olukunle (2010) suggested that information is important in health service delivery, especially in fighting communicable diseases and as such the supply of information to health professionals in rural areas of Africa is crucial. Olukunle further proposed that there is a need to change the format of information sources to DVDs and hand-held devices with up-to-date information instead of books that are often not available in rural communities. Kendall (2010) noted that HIV-related diseases have no cure; therefore information is the only armament that can be used to make people aware of how to prevent the diseases. Uganda is one of the countries in Sub-Saharan Africa that has managed to decrease the scourge of HIV by implementing policies focusing on information dissemination through libraries (Kendall, 2010). Nylenna and Aasland (2000) argue that physicians are dealing with patients who have undiagnosed problems and therefore need to be regularly updated in all fields of medicine, so that they are able to make appropriate diagnoses and institute appropriate treatment plans.

3.7 Information-seeking behaviour of medical doctors and professional nurses

Information seeking integrates strategies used for seeking information, time spent and how information is evaluated. Prada (2000) suggests that information-seeking behaviour varies from one user group to another user group. It is for this reason that studies of information behaviour have become essential in order to explain various users' information needs and information seeking. Kostagiolas, Ziavrou, Alexia and Niakas (2012) note that the work roles of health professionals make it a fundamental necessity that they have access to updated information, to enable them to cope with developments

in their field and facilitate information sharing with their colleagues and patients. The authors further argue that the legitimacy of health care services is dependent on the empirical evidence of the information-seeking behaviour of health professionals. It is therefore hoped that understanding the information-seeking behaviour of medical doctors and professional nurses in the OR Tambo District will provide insight into the extent of their access to information, if any, and contribute to improving health care services in the Eastern Cape.

Information seeking plays an important role in everyone's life. People always want to be informed, whether it is about personal matters or work-related matters. The seeking and finding of information is more critical in the lives of doctors and nurses, as information is needed for the overall treatment of patients. Information seeking is dependent on a number of factors, and thus information seeking behaviour will differ from person to person. Smith (1996) suggested that when treating patients, many doctors use knowledge in their heads, and this knowledge is often outdated. This makes information seeking an urgent need for medical doctors.

The existing literature on information behaviour demonstrates that the information seeking strategies of medical doctors and professional nurses differ, depending on the situations they find themselves in. Spink and Cole (2001) reported that information seeking is not a straightforward activity and requres access to various sources, in order to get information required to deal with both personal and work-related needs. Gonzelez-Gonzelez *et al* (2007) observed that doctors seek information through asking questions either during or after their consultations with patients. Davies (2007) agrees that doctors and nurses seek information by asking questions, but also notes that 40% of the questions are not pursued due to a lack of time. Moreover, Coumou and Meijman (2006) found that physicians seek answers to a limited number of questions. Despite the availability of online resources, it has emerged that consulting colleagues, followed by using print sources, is still the norm for most medical doctors and professional nurses (Younger, 2010). This inclination towards human and print sources is associated with the

time it takes to look for information on the internet and the inability to fomulate the right questions (Ely *et al*., 2005); these factors act as a hindrance in information seeking by medical doctors and professional nurses. As noted by Leckie *et al.* (1996), once the information seeking process starts, intervening variables such as information source and the general awareness of the information will either facilitate or hinder the process of seeking information.

There is a general assumption that doctors seek information more than nurses do. Hall, Cantrill, and Noyce (2003) posit that a lot of pharmaceutical information is aimed at doctors and is therefore in a format not suitable for nurses. McKnight (2006) shares this view when arguing that hospital library services are normally designed more for physicians' information seeking activities than nurses. These might be the reasons why nurses seek information less than doctors do. McKnight further established that many nurses believed it is ethically and morally wrong to take time away from patient care in order to search for information. Gorman, Yao, and Seshadri (2004), in Oregon, United States of America observed that doctors typically consult one or two information sources to find answers to their questions for a period of ten to fifteen minutes**.** Flynn and McGuinness (2011), in an Irish survey of information behaviour and attitudes of hospital doctors, found that doctors regularly seek information to answer patient-related queries. Furthermore, doctors often seek information outside of working hours, as they experience barriers related to time and lack of information sources at work. The study also revealed that 260 questions per doctor annually were raised during consultations (Flynn & McGuinness, 2011). In a study of information-seeking and the use of internet by general practitioners in France, Boissin (2005) found that the credibility and accuracy of the information source are criteria used by doctors in the decision to use the internet in clinical practices. Doctors needed to access information at the point of care in order to deal with problems as they arise, to produce quality services, and reduce errors (Flynn & McGuinness, 2011).

McCaughan *et al*. (2005) posit that nurses in general use their personal experience as a

primary source of information. Nurses tend to stick to what has worked for them in the past. This view is shared by Al-Ghabeesh, Abu-maghli, Salsali and Saleh (2012) in a study conducted in Jordan which demonstrated that the Jordanian professional nurses relied on personal experience, what they learned during nursing education, what they have learned from interactions with patients, discussions between nurses and doctors as well as policy and procedure manuals. French (2006), in his study exploring uncertainty and information needs in nursing sisters in the United Kingdom noted that nurses had difficulty with identifying and articulating their information needs during information seeking. Similarly, in a survey of the information needs and uses of Thai nurses, Cheng (2004) observed that although both doctors and nurses needed information for patient care, questions posed by doctors were more clinical than those posed by nurses. In a study of barriers and benefits associated with nurses' information seeking in the United States of America, Jones *et al*. (2011) noted that nurses did not have proper skills to seek information. On the other hand, Dorsch (2000) whose study investigated the needs of rural health professionals in the United State of America noted that rural doctors and nurses used information less frequently than their counterparts in urban settings. Furthermore, Verhoeven *et al*. (2010) studied how nurses seek and evaluate clinical guidelines in the Netherlands, and noted that nurses considered practical relevance and completeness of information as the main criteria when seeking information. Kannampallil, Jones, Patel, Buchman and Franklin (2014) in their comparative study of information strategies of nursing practitioners, residents and physicians in the United States of America found that nurses dealt with fewer numbers of patients than doctors, only 4.8 patients per day. Winters *et al.* (2007), in their study to assess access to and use of research by rural nurses, found that information searching by nurses varied in frequency from 2-3 times a day to 2-3 a month.

3.8 The channels and sources of information used by medical doctors and professional nurses

The aim of this section is to explore which information sources and channels of communication are used by medical doctors and professional nurses in their work. Different information sources, formal and informal, may be exploited by medical doctors and professional nurses to satisfy their information needs.

Ogunronbi (2001) refers to information sources as instruments that bear information, such as books, computers and other electronic information sources. Abbas, Abubakar, Omeiza, and Minoza (2013), for their part, posit that when medical doctors seek information, regardless of where they are, they consult print information contained in books and journals, electronic information in databases, electronic journals and electronic books, and human information sources such as colleagues. Individuals who have knowledge of the subject maybe consulted telephonically (Abbas *et al*., 2013). In the case of the OR Tambo Health District, these might be specialists whom medical doctors rely on but who are not available in the district hospitals. In contrast, Tagg (2007) is of the opinion that medical doctors do not often seek information from external sources but usually rely on their own knowledge.

According to Laki (2016) in a study entitled *Factors influencing health information-seeking behaviour among health care providers at health facilities in Tanga Region*, years of service play a role in determining the kind of information sources that health professionals will consult. The study found out that those with less experience in the medical field get information from books and the internet and were not keen to consult colleagues who were more experienced than they were. This could well reflect insecurity in the workplace; doctors are unwilling to appear as in need of guidance as they are, and thus choose to keep their information seeking private.

In an ethnographic study that examined sources of practical knowledge among nurses, Estabrooks, Rutakumwa, O'Leary, Profetto-McGrath, Milner, Lever and Scott-Findlay (2005) identified four themes that explained information sources used by nurses. The first was found to be social interactions, that is, interactions between nurses and their

colleagues, as well as between nurses and their patients or families of patients. The second was informal interaction with peers. This was particularly popular as a source of information as nurses found it easy to talk to their peers. The reliability of peers, and the fact that their information is imparted in a friendly and supportive way, played a big role in making this the commonest form of information seeking for nurses. Experiential knowledge is the third means that nurses use to get information. This is the knowledge that nurses have accumulated over their years of working, knowledge that they have gleaned over time. Document-based sources are the last option used, which includes unit-based sources (e.g. newsletters, patient records, procedure manuals) and off-unit sources (e.g. books and journals) (Estabrooks *et al*., 2005). The use of unit-based information sources is supported by Lupianez-Villanueva, Hardey, Torrent and Ficapal (2011), in their study of internet use for professional information seeking by nurses in Barcelona. This study demonstrated that nurses relied heavily on the Nurses' Association of Barcelona bulletin.

The choice of information source can be influenced by factors such as time available, the availability of an information source and the quality of an information source, amongst others. Formal sources of information such as books and journal articles are located through recognised means of organising information, while informal sources refer to those sources that are not published through traditional channels - such as friends and colleagues (Fulton, 2010). Wilson (2000) suggests three source characteristics that impact on use of information sources, namely access, credibility, and channel of communication. In terms of access, it is important that sources of information are easily accessible, as a lack of access may impede information seeking or impose high costs that the information searcher might not be able to pay. Regarding credibility, if the information searcher doubts the quality and accuracy of the information provided in a particular information source, the chances are that the information searcher will regard that information source as lacking credibility (Wilson, 2000).

Similarly, Leckie *et al*. (2006) identified cost, trustworthiness, and familiarity with information source, accessibility, and format as determinants of information source use. According to Leckie *et al*. (2006), the perceived accessibility of the information source is the prevailing factor that professionals identify when looking for information. Often, channel and source of information are terms used interchangeably, but in this study the channel is perceived as a means through which medical doctors and professional nurses receive information to satisfy their information needs. The channels that can be utilised for information access range from electronic, print, and interpersonal contacts. Interpersonal contacts in the form of colleagues seem to be the most preferred information channel used by medical doctors and professional nurses. Wilson (2000) noted that the channel through which information is received plays an important role in the subsequent use of information. For instance, information received by means of interpersonal channels may be given more attention than information gained through mass media (Wilson, 2000). Macgettigan, Golden, Fryer, Chan, and Feely (2001) conclude that the medium through which information is available seems to be more important to doctors than the message. Macgettigan *et al*. (2001) found that doctors preferred personal contacts as the most reliable information source. Understanding the various sources of information used by various users of information is valuable for information providers in order to provide sources of information that are responsive to the needs of each user group. The provision of information sources that respond to the needs of medical doctors and professional nurses would contribute to the improvement of services they provide for their patients.

Bennett *et al*. (2004) posit that a lack of information sources thwarts the efforts of medical doctors to find answers to clinical questions, thus compromising patient care. It is therefore important to ascertain the preferred sources of information by medical doctors and professional nurses in order to improve the provision of those sources and their packaging. New medications and treatments are introduced at a rapid rate; and new rare diseases are uncovered that need specialised knowledge. This compels doctors and nurses to consult up-to-date information sources to inform their decisions and get answers

to the challenges they face (Bennett *et al*., 2004).

Factors such as the age, experience, specialty, practice type, the availability of specialists and colleagues have been mentioned as playing an important role in influencing a doctor's decision regarding which information source to search. Similarly, Leckie *et al*. (1996), for their part, argue that the use of libraries increases with the length of time since a doctor's initial training. In addition, consultation with colleagues decreases, as doctors grow older. When deciding which information source to use, age and the number of years in practice mostly influence nurses. Ely *et al*. (2005) mention convenience as a factor in the choice of which information source to use; health workers frequently consult an information source because it is convenient to access, not because it is the best source. These findings concur with the early findings by Gruppen (1990), whose study also demonstrated that younger doctors preferred medical literature and colleagues, while older doctors preferred continued medical education courses and pharmaceutical representatives. Gruppen further suggests that these differences in information source preference are due to generational differences. In this study information sources used by doctors and nurses have been categorised under interpersonal, print and internet sources.

3.8.1 Interpersonal information sources

Akhtar *et al*. (2011) carried out a comparative study to compare sources of drug information used by doctors, pharmacists, and nurses in government and private hospitals in Islamabad. Although the results showed variations in information source preferences, nurses were found to prefer interpersonal information sources in the form of colleagues, which included senior doctors and senior nurses. Doctors and pharmacists preferred other sources. Similarly, Hall, Cantrill, and Noyce (2003), in a study to determine information sources used by community nurse prescribers, showed that nurses utilised colleagues - nurse specialists, pharmacists and GPs.

Fieschi *et al*. (2004) conducted a study on information seeking by rural and non-rural clinicians. Their study reported that most rural and non-rural clinicians rely heavily on

human sources for information, although rural clinicians had less access to human sources such as specialists. Leckie *et al*. (2006) also showed that physicians in urban settings consult with colleagues more than physicians in rural settings. This can, however, be attributed to a paucity of medical professionals in rural areas, as mentioned somewhere in this study. The choice of colleagues as the most used information source by clinicians was associated with their availability, familiarity, and reliability. Moreover, there are no costs involved when getting answers from colleagues (Dee & Blazek, 1993; Kosteniuk, 2013; Norbert & Lwoga, 2012; Tumwikirize *et al.*, 2008). Leckie *et al.*, 1996) also noted, "colleagues" inherent value goes deeper than being easily accessible and dispensing accurate information. It allows the medical professionals to socialise, to leave routine, to display personal knowledge, and generate professional contacts". Gorman, *et al*. (1994) further suggest that doctors tend to choose information sources that are easily available, cost effective and do not take a lot of their time and effort. Colleagues fit this description.

In a study of hospital clinicians' information behaviour, which included both medical doctors and professional nurses, amongst other health professionals, conducted through a questionnaire survey in Ireland, Flynn and McGuiness (2011) also found that colleagues were used extensively as information sources. Callen *et al.* (2007) carried out a study of clinical information sources used by 263 doctors in Mongolia, and found that discussions with colleagues was the most frequently used method of getting information. Callen *et al*. (2007) further found that only 41% of respondents had good computer skills and female respondents were less likely to have computer skills than their male counterparts. Pravikoff *et al*. (2005**)** conducted a study to assess the readiness of nurses for EBM. About 3000 registered nurses around the United States of America were part of the study and 67% of the respondents indicated that they preferred asking colleagues instead of searching formal sources such as books and journals**.** Other researchers who have reported reliance of nurses upon their colleagues for information include Spenceley, O'Leary, Chizawsky, Ross& Estabrooks (2008); Thomas (2012); Thomson *et al*. (2004); Turner *et al*. (2008); Marshall, West & Aitken (2011). Similarly, Mcknight (2006) points

out that the sources of information used by nurses in an emergency unit are mainly people, including patients, patients' families, doctors, other nurses, and other health care workers. Nurses in emergency units also seek information by scanning the environment they work in for answers and patient records. Furthermore, nurses in critical care units tend to seek information verbally. The study established that patients are the most used source of information by nurses. In addition, notes written on charts by other nurses were read, face to face conversations were held about patients, telephone calls were made to ask about patients, and reports were handed over to nurses who took over patient care at the end of a shift. All of this was found secondary compared to speaking to the patient. Furthermore, McKnight found that critical care nurses made great use of their senses - touch, smell, sound, and sight. Critical care unit nurses hardly asked for knowledge based information when on duty. It also emerged that there was simply no time to consult print documents or the internet when on duty and that nurses believed it would be morally and ethically wrong to use patient time to go in search of information. Also, McCaughan *et al.* (2005) and O'Lynn, Luparell, Winter, Shreffler-Grant, Lee, and Hendrickx (2009) found that nurses in general practice used their personal experience as a primary source of information. They tended to stick to what had worked for them before. This view is shared by Al-Ghabeesh *et al.* (2012) in a study conducted in Jordan to explore the sources of knowledge used by registered nurses. The study showed that the Jordanian registered nurses relied on personal experience, what they learned during nursing education, what they learned from interactions with patients, discussions between nurses and doctors, policy and procedure manuals.

Cogdill (2003) suggests that private nursing practitioners are greater searchers of information than nurses working in government hospitals, and they consult a wider variety of information sources. This is because private nursing practitioners experience the same information needs as doctors because of the types of patient encounters they are exposed to. Nursing practitioners' needs is a reflection of their duties as they are frequently responsible for diagnosis, drug therapy and treatment of their patients (Cogdill, 2003). Similarly, Hall *et al*. (2003), in their study of information sources used

by community nurses who prescribed medication, found that those who prescribe medications consult more information sources than those who do not prescribe, to assist them in making prescription decisions.

In the African continent the reliance on colleagues as a source of information is also prevalent. Tumwikirize *et al*. (2008), using a questionnaire, studied access to and use of medication information sources by physicians in public hospitals in Uganda. The respondents came from the district, regional, and university hospitals. All respondents from the district (100%) confirmed their reliance on colleagues, while respondents from regional hospitals (98%) used literature from pharmaceutical companies. Physicians in university hospitals (99%) used print research publications. Oshikoya, Oreagba, and Adeyemi (2011) showed that, despite the use of different information sources, reliance on colleagues remains high amongst doctors in a teaching hospital in Ibadan, Nigeria.

Using a questionnaire, Nwagwu and Oshiname (2009) investigated the information needs and information-seeking behaviour of nurses in university college hospitals in Ibadan, Nigeria. The majority of nurses used colleagues, and they reported a lack of access to information as a major inhibitor of information seeking. The results are consistent with Norbert and Lwoga (2012) in their study of the information-seeking behaviour of physicians in Tanzania; and Buba and Ocheibi (2003) in a study to determine information and the information gathering behaviour of medical doctors in Maiduguri, Nigeria.

In South Africa, a study by Fourie and Claasen- Veldsman (2007) on oncology nurses ‘need for current awareness services in the South African context also confirmed use of colleagues by health professionals. The study revealed that the staff in the oncology clinic relied on oncologist doctor for information. Another South African study to identify sources from, which doctors obtained information on HIV and AIDS by Naidoo et al. (2010), found that 92.4% of 166 respondents confirmed the use of journals as a source of information.

The preference of human information sources in the form of colleagues was an indication that doctors and nurses did not always use information that was up-to-date and reliable. As pointed out by Smith (1996), information in people's heads was frequently outdated; therefore it could not be reliable.

3.8.2 Print information sources

Despite a heavy reliance on interpersonal information sources, some medical doctors and professional nurses still placed their trust in print information sources. Moreover, amongst medical doctors and professional nurses, print sources had emerged as the second most preferred information source, after their colleagues. Even with the internet revolution, print materials remain the second most popular information source for both medical doctors and professional nurses. This finding has been reported by both old and more recent studies. Gorman *et al.* (1994) carried out a study to determine whether medical doctors' clinical questions could be answered by the literature found in journals and the results demonstrated that journals still offered sufficient information to answer medical doctors' clinical questions. Dawes and Sampson (2003) reported that medical doctors also consulted books for information. Similarly, Coumou and Meijman (2006) reported that doctors consulted books for answers based on their literature review to determine how primary care physicians sought answers to clinical questions. On the other hand, Leckie *et al.* (1996) observed that nurses consulted patients' records and laboratory results and were generally not aware of the sources available in the library. Those nurses who consulted libraries were more likely to do so to answer management-related questions and for studying purposes. Ocheibi and Buba (2003) reported that journals were the first preferred choice of information source for medical doctors, whilst online information was ranked last due to its unavailability and prohibitive costs.

3.8.3 Electronic information sources

Electronic information sources are those sources that are accessed through the internet

including databases such as PubMed or search engines such as Google. Odunewu (2004) asserts that the internet is the dominant type of information and communication technology (ICT) and has enormous reservoirs of information, covering all subjects. Moreover, Andrews *et al.* (2005) points out that that there is consensus that the quality of health care is determined by better information services and enabling technology. Casebeer, Bennett, Kristofco, Carrillo, and Centor (2002) posit that the volume of internet usage among physicians is growing rapidly. Casebeer and colleagues further contend that physicians need access to information that is accurate, immediately available, and easy to use and the internet seems to meet these criteria. Besides, the internet is invaluable for physicians as it is also used for continuing medical education, allowing physicians to study from home and provide access to medical journals and literature. Supporting Casbeer *et al*. (2002)'s argument, some studies have demonstrated the use of the internet by medical doctors. In a study of information-seeking behaviour amongst family physicians, Bennett *et al*. (2005) showed that the majority of the family physicians used the internet for information related to patients' ailments.

Again, Bryant (2000), in a study of information needs of family doctors, argued that physicians' dependence on the internet is due to the fact that physicians have little or no time to use traditional libraries. Bryant further argues that the internet offers a lot in terms of both access to information and general communications such as the transferal of patient data. In a study to determine the level of internet usage by medical doctors in Switzerland, Koller, Grutter, Peltzenberg, Fischer and Steurer (2001) found that although 75% of respondents had access to the internet, only 7% used it during patient consultations. This was attributed to time constraints and the wish to avoid potentially negative impressions in patients. Murphy, Fleming, Martin-Misener, Sketris, MacCara and Gas (2006), in a study to ascertain the drug information sources used by nursing practitioners and collaborating physicians in Canada, found that the internet was ranked as the least used information source.

Although almost all physicians were keen users of the internet, the study found that

physician specialists were greater users of the internet than family physicians. These findings contrast with those of Lee, Giuse, and Sathe (2003) in a study of rural and urban public health professionals of Tennesse in the United States of America. Although the results in the study varied depending on the health worker's specialty, the overall results pointed to the lack of access to computers and internet, which hampered the finding of information. These findings seemed to concur with a recent study by Salman, Ahmed, and Khan (2013) in a survey of doctors working in remote government health facilities in Pakistan where 74% of respondents were found to have no access to the internet and 52% were not confident in using the internet. A lack of computer skills was cited as a barrier to the process of information seeking. In the same vein, nurses were found not great users of the internet. Winters *et al*. (2007), in their study to determine access to and use of the internet amongst rural nurses, reported barriers associated with the internet to include a lack of skill, a lack of time and a lack of access to internet. A similar finding was reported by Dee and Steynley (2005); Lee *et al*. (2003); Schilling, Steiner, Lundahl and Anderson (2011). Lee *et al*. (2003) further reported that health professionals in rural settings were even more deprived than their counterparts in urban settings. Likewise, in rural Oregon in the United State of America a study by Turner *et al*. (2008) reported that the lack of access to the internet acted as a barrier to nurses' information seeking.

Hiney (2005) examined the use of the internet by nurses to support professional development and clinical practice in Ireland and reported that the internet was not used due to internet illiteracy, a lack of support and isolation. McCaughan *et al*. (2005) posited that nurses were not aware of the wide range of information available online.

McCaughan and colleagues found that among nurses' reasons for not using the internet was technophobia. Owing to the lack of computer skills, nurses found themselves scared of trying to use computers and lacking the confidence to explore its potential. Information overload was also mentioned as confusing nurses who tried to access the internet. Nurses also did not know how to filter out non-useful information from the tons of information available on the internet (McCaughan *et al*., 2005). Similarly, Jones *et al*. (2011) reported

factors that prevented nurses from using web-based sources of information including a lack of time to search, a lack of knowledge of the required technology and a lack of experience in doing so. Moreover, Debowski (2003) posits that as more services are posted online, as systems capacities increase and search tools become more refined and sophisticated, the more difficult it becomes for health professionals to search the web.

These findings are consistent with the recent study by Majid *et al*. (2011) which found that nurses were using minimal electronic resources owing to a lack of search skills and a lack of knowledge about the available sources. The lack of access to the internet could be associated with the fact that many of these studies were conducted in rural and public health settings. As noted by several researchers, doctors and nurses in these settings experience profound barriers when it comes to internet access. Andrews *et al*. (2005) noted that all rural health professionals, including physicians, did not have the privilege of having access to the variety of information sources that their colleagues in urban settings enjoyed. The lack of time, isolation, the lack of equipment, inadequate library access, the lack of information skills and inadequate internet infrastructure were major problems (Andrews *et al*., 2005).

Although the situation is reportedly worse in developing countries, especially those in Africa, Ajuwon (2006) in Nigeria found that almost all the respondents were using internet and 90% of physicians were searching the internet for information related to patient care. Physicians were even searching medical databases. Ogbomo (2012) and Norbert and Lwoga (2012), on the other hand, noted the lack of internet access as an inhibitor in information seeking. Godley *et al.* (2004) observed that health professionals in the developing world still suffered from what they called "information poverty". Despite the promises brought by the information revolution such as ICT availability and improved content, there is still a gap between the developed and developing world in the use of these resources.

3.9 Factors that facilitate and hinder information seeking by medical doctors and nurses

Previous research has demonstrated that certain factors may either facilitate or hinder information seeking. Though it might be assumed that when the need for information arises, the next step is seeking information to satisfy the need. However, in some instances the need for information does not lead to information seeking (Wilson, 2005).

Health professionals are encouraged to practice evidence-based medicine. Royle and Blythe (1998) contend that in order to practice evidence-based nursing, nurses need to be equipped with the necessary skill to tap into available information sources. Evidence-based practice involves incorporating best evidence from research into clinical decisions. Royle and Blythe add that the quality of information used for decision making by nurses, and how they evaluate it will influence health outcomes. However, despite the importance of incorporating the best evidence into their practice, health professionals encounter various barriers that prevent them from fully accessing information. As demonstrated in literature there seem to be more factors that hinder access to information by doctors and nurses than those that facilitate access.

Bostrom, Kajermo, Nordstrom and Wallin, (2008) identified several barriers to the use of research that they believe were the most prominent. One of these is the issue of isolation. This normally affects those health professionals in rural areas, where facilities are inadequate for implementation. Frequently, electronic media are not available and in addition, the relevant literature is not stored in one place. The issue of relevant literature not compiled in one place was also seen as barrier to use of research. Not surprising, as both medical doctors and professional nurses often mention lack of time as a hindrance to information seeking activities. With limited time in their hands, finding the relevant literature can be difficult especially when the literature is not well organised.

Chien, Bai, Wong, Wang and Lu (2013) also identified a number of barriers that prevent professional nurses from using research for their clinical decisions. Amongst the array of barriers, the top four were; insufficient time to engage with research and implement new ideas on the job; nurses do not see the value of research for practice; the facilities are inadequate for implementation of ideas learned; and nurses are unaware of the research. With regard to awareness, Jones et al. (2011) believe that the under utilisation of information for patient care by nurses may be the result of a lack of awareness about available information sources.

In addition, DiCenso, Gordeon, Guyatt and Ciliska (2005) suggest that individual traits of nurses can be barriers to their utilisation of information for patient care. In their study, the nurses mentioned research findings that are irrelevant for their practice, having limited decision-making authority to change decisions about patients, lack of skill to search and appraise information, and lack of time.

Laki (2016), in a study of factors that influence health information-seeking behaviour among health care providers at health facilities in Tanga region, found that many barriers to information access in the African context are a result of lack of timely and relevant information. Laki further argues that the availability of relevant and up-to-date information at the point of care through use of Information and Communication Technologies (ICTs) could circumvent many of the deaths and other health problems that are experienced across Africa. Furthermore, ICTs can provide more efficient ways of accessing information, including facilitating sharing of knowledge amongst colleagues outside of their work place, thus overcoming the constraints of geographical distance (Laki, 2016). In addition, Bernarda, Arnoulda, Saint-Lary, Duhot, and Hebbrech (2012), for their part, posit that the internet is the relevant tool for the provision of information for the management of patients.

In their study on the use of evidence-based medicine in the practice of consultant physicians, Scott, Heyworth and Fairweather (2000) say that 74% of respondents in

developing countries blamed lack of time for their under utilisation of information resources. Jones *et al.* (2011) mentioned organisational barriers. In this regard, Duff (2000) postulates that an organisation can be a barrier to information seeking and use by limiting or prohibiting the use of the internet. This is frequently done to prevent a perceived abuse of the internet, and in an attempt to curb excessive use of social media. It has the unwitting effect, however, of preventing necessary consultation of sources with consequences for health care.

In a study on barriers to optimal utilisation of health information resources by doctors in Nigeria, by Nwafor-Orizu and Onwudinjo (2015), the respondents mentioned seven factors perceived to be barriers to information utilisation. These included the high cost of acquiring information; the lack of up-to-date information sources; no proximity to the library; inadequate library opening hours; poor internet connectivity; and inadequate time to read or browse. In this regard, in Bertulis and Cheeseborough's, (2008) study, respondents reported needing "protected time" for information-seeking activities.

Lack of confidence and attitudes were also mentioned as being factors that prevent nurses from integrating information into their practice in a study by Royle, Blythe, DiCenso, Boblin-Cummings, Deber and Hayward (2000). With regard to attitudes, Laki (2016) assumes that the way a person reacts towards the use of certain services is influenced by the person's general attitude to new ideas. Attitudes guide behaviour in all activities, and underlying motives for taking or not taking a particular course of action are not always honestly revealed in surveys.

Other researchers have categorised factors that may either hinder or facilitate the gathering of information as follows:

Demographic factors: Demographic factors that can influence information seeking include, amongst others, age, gender, and education level. For instance, a highly educated user is more likely to find it easy to interact with information and therefore can easily engage in the process of seeking information (Wilson, 1999). With regard to gender,

Steinerova and Susol (2007) observed that gender differences influence information-seeking behaviour amongst medical doctors. The researchers observed that men were confident enough to undertake the search on their own, while women tended to require a librarian's help more frequently. This observation is in line with the findings by Bennett *et al*. (2005) that female physicians were less confident when searching for information on the internet than their male counterparts. Mclnerney and Suleman (2010) observed that younger practitioners had a better understanding of search strategies than older practitioners. Similarly, Dorsch (2000) also reported that younger physicians asked more questions than the older physicians. Liverman, Ingalls, Fulco, and Kipen (1997) point out that due to the rapid development of technology, the new breed of health professionals is much more technologically literate, making them more adept computer users and better at accessing information than the old breed of health professionals. Dee and Stanley (2005) concur with Liverman *et al*. (1997) observations. In a study on the information-seeking behaviour of students and clinical nurses, the results showed that nursing students were using online databases more than clinical nurses. It therefore could be argued that the nursing students, who are presumably younger than nurses, were more information literate and interacted with online sources with ease. Furthermore, Ramoanov and Aarino (2006) observed that having a skill to search for information directly influenced the use of computers to access information.

Cost factor: The cost of searching, which encompasses time that is spent, the financial costs of using the internet and travelling costs to where information is available, is more likely to either hinder or support the seeking of information (Liverman *et al*., 1997). Turner *et al*. (2008) and Davies (2007) refer to the cost of attaining the information sources as the determining factor for information seeking.

Role factors: Wilson (2000) and Leckie *et al*. (1996) stated that work roles have an influence in information seeking. Wilson (2000) further highlights that if personal needs lead to information seeking, it is worth recognising that those needs emerge as a result of roles that individuals play within a society. Leckie et al. (1996) in their study to review

information seeking habits of professionals, including engineers, healthcare professionals and lawyers, found that surgeons sought more information on patient care than pediatricians did.

Characteristics of information source factors: Wilson (2000) refers to three source characteristics that impact on the use of information sources: access, credibility, and channel of communication. Regarding access, it is important that sources of information are easily accessible, as a lack of access may impede information seeking or impose high costs that the information seeker might not be able to pay. Leckie *et al*. (2006) refer to accessibility as the important factor that enhances the ability of professionals to seek information. Regarding credibility, if the information seeker doubts the quality and accuracy of the information provided in a particular information source, the chances are that the information user will regard that information source as lacking credibility. Boissin (2005) suggested that credibility and accuracy of the information source play a critical role in the decision to use the internet in clinical practices.

Time factors: Various researchers have consistently mentioned the time factor as the determinant for information seeking for both medical doctors and nurses (Andualem, *et al*., 2013; Dee & Stanley, 2005; Dorsch, 2000; Norbert & Lwoga 2012; Thompson *et al.*, 2005). Seemingly medical doctors and professional nurses do not have time to access information. Not surprisingly, the nature of their work requires them to spend most of their time with patients. They tend to work long hours and the situation is even worse for those working in critical care units. The implication for information providers is that readily available information should be provided at the point of care for medical doctors and professional nurses.

Information literacy skills: The increasingly complex world in which we live contains an abundance of information choices such as print, electronic, image, spatial, visual, sound, and numeric. The issue is no longer one of not having enough information, it is just the opposite – too much information and in various formats and not all of equal

value. It is important for all people in this day and age to have the skill of managing information in order to use it effectively. People can benefit from having access to various information formats as long as they are able to discern critically the kinds of information they encounter and isolate what they need. This requires people to be information literate (Rockman & Associates, 2004). Gavgani (2009) notes a lack of skill in searching, organising, and appraising information by health professionals in his study of evidence based medical librarianship (EBML) in Iran. He revealed that studies conducted in 2006 and 2008 in Iran and India respectively suggested that physicians have very limited knowledge about sources of evidence. Candy (2005) suggests that information literacy is crucial in health services for the following reasons:

- Health information comes in a variety of forms and formats and it is important that health professionals understand all the forms and formats;
- Health professionals need to understand documents, charts, records, dosages and treatments that they administer to their patients;
- There is an increasing volume of complex information, which calls for self-directed learning. Health professionals must be able to sift through complicated information to get the right information for their patients;
- In the information age there are many challenges that demand lifelong learning such as the increasing impact on health service provision of E-health and Tele-medicine.

Furthermore, Spencely *et al*. (2008) point out that when it comes to information sources used by nurses, context influences the decision to pursue or not to pursue information seeking. Spencely and collegues argue that factors such as organisational culture, administrative support, time to seek information and the availability of up-to-date information sources will support or hinder information seeking by nurses. Mhaolrunaigh and O'Leary (2007) postulate that organisations have the role of encouraging nurses in

their research activities, either by providing time and resources or by making sure that research is collated and supplied to nurses. Jones *et al.* (2011) posited that nurses do not possess sufficient information literacy skills for clinical practice. Sanders and Del Mer (2005) argued that the limitation of information literacy skills amongst medical doctors constituted a barrier that hindered effective information searching. Ely *et al*. (2005) also reported on factors that prevent health professionals' information seeking including the failure of healthcare professionals to recognise the information need, their pursuing questions only when they believe an answer existed, and not being able to formulate questions in such a way that answers could be sought with their available resources. Bennett *et al*. (2005) reported that a lack of specific information that physicians needed also constituted a barrier to physician's information seeking.

Forsetlund and Bjorndal (2002) conceded that the use of clinical research amongst doctors and nurses has always been a challenge. In their study of identifying barriers to the use of research in public health practice, they found that they were not using it even though they appreciated the need to use information. This is despite the fact that doctors in Norway take numerous responsibilities, which include planning a health service and developing policies in addition to clinical responsibilities. The lack of awareness about information sources was also reported to be the main barrier to using evidence-based information for practice.

3.10 Summary of literature review

From the above literature review, it is apparent that research on the information behaviour of medical doctors and professional nurses in a local context (South Africa) is lacking; as is research on the information behaviour of medical doctors working in hospitals. Besides, there are a vast number of studies addressing the information behaviour of doctors and nurses in other parts of the world, especially in America and Europe. There are also different categories of nurses; namely PNs, nursing assistants and staff nurses whose information behaviour needs to be understood. Current studies of nurses' information behaviour do not differentiate between these categories of nurses;

they are all treated as a homogenous group (Nwagwu & Oshiname, 2009; Clarke, Belden & Koopman, 2013; O'Leary & Mhaolrunaigh, 2012). The information behaviour of one category of nurse is likely to differ from that of another due to their differing roles. For example, professional nurses are expected to teach patients how to manage their conditions and adhere to their medication protocols (Westbrook *et al*., 2008). In addition, nursing assistants' roles include promoting and maintenance of patient hygiene, maintaining patient's physical comfort, and feeding patients (Mabunda, 2001). Similarly, with regard to medical doctors, studies have tended to focus on one aspect of information behaviour namely information sources or information needs, and on doctors working in one specific unit such as the emergency unit. The available studies lack a profound understanding of the totality of human behaviour of medical doctors. This study sought to address these gaps by investigating the totality of information behaviour of medical doctors and professional nurses.

Besides, amongst information behaviour studies of health professionals, medical doctors, and professional nurses constitute the prominent groups. Based on the literature review, it is clear that in both developed and developing countries as well as urban and rural settings, the need to provide the best quality patient care is the overriding reason for health professionals' to seek information. Continuous professional development is reportedly the second reason for doctors to seek information, followed by the need to keep up to date with new developments in various fields of specialization or clinical practice. In addition to patient care, research and teaching have been reported as the other reasons for medical doctors to look for information. Nurses need information regarding a wide variety of activities, as they are involved in numerous hospital-based activities, which result in many information needs. They need information pertaining to protocol, procedures, policies, and drug therapies. Although patient care is one of the reasons for nurses to seek information, it is not often ranked as the main reason for their information needs, perhaps because nurses usually take doctors' orders on how to care for patients.

Not all information needs end with information seeking, due to the various barriers that exist. Doctors find information mostly by asking and most information queries are not pursued during consultations, due to time constraints. This means that some of the questions related to patient care are not answered at the time when the patient is present. Nurses rely not only on colleagues but also on personal experience for information. Nurses find it difficult to articulate their information needs and pose fewer questions than doctor do. In addition, doctors and nurses in rural settings seek information far less than their counterparts in urban settings.

Doctors and nurses use various information sources. However, discussions with colleagues remain the most prominent way of accessing information for both these groups. The internet is less frequently used because of its non-availability, the cost of accessing it, and a lack of computer literacy. Studies that focus only on information sources used by doctors and nurses are scarce. As numerous studies have shown, health professionals view colleagues as reliable, familiar, immediately available and not expensive. The overall picture regarding the attitude of doctors and nurses towards information is a positive one – they recognise the need for up-to-date information. Even those who have no access to information owing to various constraints appreciate the benefit of having access to information for patient care. Information seeking does not happen in a vacuum. Certain factors may either facilitate or hinder information seeking. Factors such as the source's characteristics, the cost of an information source, demographic factors, time, and skill searching for information influence the seeking of information and these factors can seriously hinder or enhance the information seeking process.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

Research methodology refers to the procedures by which researchers go about their work describing, explaining, and predicting phenomena (Rajasekar, Philominathan & Chinnathambi, 2013). It provides a researcher with a plan of how to carry out his or her research. This chapter presents research paradigm, research approach, research design, population and sampling procedures, data collection and analysis method.

The purpose of this study was to investigate the information behaviour of medical doctors and professional nurses in selected district hospitals of the OR Tambo Health District in the Eastern Cape Province of South Africa. The study sought to answer the following research questions:

1. What roles do medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District perform?
2. What tasks do medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District
3. What are the information needs of medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?
4. What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?
5. What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?

The chapter is organised into ten thematic sections: research paradigm, research methods, research design, population of study, sampling procedures, data collection procedures,

data analysis strategies, validity and reliability of data collection instruments, ethical considerations and summary. These aspects are covered progressively in the sections that follow.

4.2 Research paradigm

A paradigm is an underlying belief or worldview, which informs a person's thinking and actions. In research, it is important for a researcher to be clear upon what her paradigm is before she/he begins the research process. Johnson and Christensen (2012) describe a paradigm as "a perspective about research held by a community of researchers that is based on a set of shared assumptions, concepts, values, and practices". Morgan (2007) refers to a paradigm as "a world view guided by constructs, propositions, and assumptions". There are three major paradigms in research, namely positivism, the interpretive approach and post-positivism.

According to Kaboub (2008), positivism evolved in the late 19th century as a means of truth-seeking. Auguste Comte, the thinker who described the paradigm of positivism, criticised contemporary metaphysics as being too ephemeral and asserted that only technical and scientific facts were capable of leading to truth. Aliyu, Bello, Kasim, and Martin (2014) posit that positivism is entrenched in the ontological principle that the truth and reality are independent of the researcher. The positivist paradigm is based on the idea that the world conforms to permanent and unchanging laws of causation and happenings (Aliyu *et al*., 2014). According to Weaver and Olson (2006), positivism shares philosophical foundations with quantitative research. Scotland (2012) says that positivism is concerned with formulating laws that can be used as a basis for prediction and generalisation. Creswell (2003) asserts that in positivism, research correlations and experiments are used to reduce complex interactions to their constituent parts. Positivists seek to test a theory by observing and measuring the theory in order to predict and control forces around us (O'Leary, 2004).

The interpretive paradigm, on the other hand, shares its philosophical foundations with qualitative research (Goldkuhl, 2012). Goldkuhl asserts that the interpretive model is an established, elaborate, and adapted research paradigm for qualitative research. The model was developed as a reaction to positivism and as such can be labelled anti-positivist (Mack, 2010). In contrast to positivism, the interpretive ontological viewpoint is that a research subject can never be fully understood from the outside, but is best understood through the direct participation of the observer in the subject's world (Mack, 2010). According to Mack (2010), what constitutes reality is filtered through the "lenses" of many different people and each interprets reality differently, leading to different perspectives on what constitutes reality. There is not necessarily one objective, entirely factual "reality" as the positivists maintain. Instead, reality is construed as the amalgam of the viewpoints and perceptions of many. The interpretive paradigm "is directed at understanding phenomena from an individual's perspective and investigating the interaction amongst individuals, as well as the historical and cultural contexts which people inhabit" (Creswell, 2009).

According to Littlejohn (2007), post-positivism arose because of criticism by anti-positivist scholars such as Max Webber and Heinrich Rickert who criticised the positivists for ignoring the fundamental experience of life, and instead favouring mental and physical laws. The uncertainties of researchers within the scientific community about the ontological nature of the "absolute truth" championed by the positivists contributed to the formation of post-positivism as a paradigm (Littlejohn, 2007). Post-positivists reject the idea that there is one, fixed, observable meaning to phenomenon. Instead, like interpretive, post-positivists see the world as having multiple meanings, what is seen as the truth by some might not be seen as such by others (O'Leary, 2004). Post-positivism allows for the integration of both quantitative and qualitative research methods. It uses tools such as surveys and interviews as well as observations (Creswell, 2008). Creswell further postulates that post-positivism allows for a generalisation of the results, without any interference from the researcher's personal point of view. Phillips and Burbules (2000) identify five key ideas of the post-positivism paradigm:

- Evidence from research is prone to errors; there is no such thing as absolute truth;
- The research objective should be to develop true statements that can be used to describe a phenomenon and the causal relationship between it and other phenomena;
- Objectivity should be a fundamental aim of research;
- Research is about claims, which are later refined or abandoned for stronger or more defensible claims; and
- Evidence from research, combined with rational consideration, shape knowledge.

From the above discussion Positivism's stance is based on careful observation and uses scientific methods, thus positivists believe in objectivity in research. In contrast post-positivism rejects the central belief of positivism. Post-positivism's stance is that researchers should alter their beliefs and understands truth based on probability rather than certainty. Post-positivists believe that situations that cannot be observed can be deducted from observable situations. However, post-positivism still holds a belief about objectivity in research. Post-positivism is an attempt to find a middle ground without completely rejecting positivism. Interpretative paradigm on the other hand believes that research should be done by exhaustively looking at people's living situations and experiences. While this may increase validity of the research results, the results are based on subjectivity because interpretivists tend to emulate peoples' experiences in order to understand them. Research findings cannot be generalised, as they are more personal due to deep involvement with the research subjects.

The current study has been based on the post-positivist paradigm, using a mixed methods approach, which allows for the incorporation of both qualitative and quantitative data in a single study. With positivism leaning towards quantitative methods and the interpretive model leaning towards qualitative methods, post-positivism was naturally the relevant paradigm for this study. The ontological stance of positivism is to gather facts and heavily favours quantities in the reporting of data. Neither pure positivism nor the interpretive model alone was suitable for this study, which aims to arrive at a

multidimensional understanding of the information behaviour of medical doctors and professional nurses from both qualitative and quantitative perspectives.

The post-positivist approach is exploratory, rather than merely a process of data-gathering. Consequently, this study intends to gather facts, explore various facets of the facts, and extrapolate on them. Moreover, post-positivism recognises the value of generalisations based on facts. This study's intention is to generalise the results. In a similar study by Mohamed-Arraid (2011) on the information needs and information seeking behaviour of Libyan doctors, the post-positivism paradigm was used.

4.3 Research Approach

There are two broad approaches or methods in research, the qualitative, and the quantitative. When the two methods are used together, the third research approach called a mixed method emerges.

4.3.1 Qualitative approach

The qualitative approach allows for an examination of possible relationships, effects, causes and dynamic processes in order to understand the problem being investigated (Hennign, 2010). Its strength lies in its emphasis on the process of human meaning making and the recognition of context as an essential aspect of meaning making. At the same time, it applies rigorous and systematic forms of enquiry, using data collection methods that include in-depth interviews, observations and document reviews (Creswell, Klassen, Plano Clark & Smith, 2011). Donalek (2004) asserts that conducting qualitative research is a challenging and exhausting process but carries an element of excitement, as its primary product is likely to be satisfying for the researcher. According to Henning, Van rensburg and Smit (2004); Hughes (2006); and Henning (2010), the qualitative approach allows for an examination of possible relationships, effects, causes and dynamic processes, and thus yields a fuller understanding of the problem under investigation. Henning (2010) says that the qualitative method gives respondents the

freedom to demonstrate their actions and feelings and gives a researcher an understanding of the phenomenon or place under investigation.

Creswell (2008) suggests that although qualitative and quantitative processes have much in common, the qualitative does not rely as much on text and data images, as the quantitative approach does. In qualitative research the researcher is situated firmly at the centre of the study; this central positioning requires a high degree of reflexivity on the part of the researcher (Jaye, 2002). Carlson (2010) explains reflexivity as the ability of the researcher to demonstrate that he or she has a major influence on the development of research and the respondents without influencing the results. Mack, Woodsong, MacQueen, Guest, and Namey (2005) note that the key difference between qualitative and quantitative approaches lies in their flexibility. With the qualitative approach, research is flexible, questions are open-ended, and respondents may express themselves in various ways.

The following characteristics of the qualitative research method are identified by Creswell (2008):

- Because qualitative methods are used in a natural setting, as opposed to an office or laboratory, they allow the researcher to share in the experiences of the respondents, and gain more details about the subject or setting under investigation.
- Qualitative methods allow for the development of some aspects of research during the study. The researcher can decide to change the data collection process and employ new ones, as she or he deems fit.
- It is easy to build rapport with respondents with the qualitative approach, due to the interactive and organic nature of the methods used.
- The intensive time spent with respondents, both observing and experiencing, lends itself to recognising and interpreting themes, and drawing conclusions about their meaning.

Stake (2010), on the other hand, highlights the following as weaknesses of qualitative research:

- Qualitative research is cost and labour intensive, in terms of data collection and data anlysis.
- Ethical risks are significant in qualitative research.
- It takes a lot of time to finally understand the phenomenon under investigation.
- Qualitative research contributes little to the advancement of social practice.
- Generalising results can be difficult as the findings may apply only to people included in the study.

4.3.2 Quantitative approach

According to Gorman and Clayton (2005), quantitative methods are far less flexible and nuanced than qualitative methods, concentrating on figures to interpret phenomena. Data is collected in the form of numbers. The method begins with a series of predetermined categories, usually embodied in standardised quantitative tools such as questionnaires. The researcher uses this data to make broad comparisons (Durrheim, 2006). Creswell (2003) says quantitative methods are based on the empiricist paradigm, and as such unearth data through rigorous objectivity. According to Creswell (2003), the quantitative method is used when information needs to be quantified and subjected to statistical treatment in order to support or refute alternative knowledge claims. Quantitative data is typically numerical in nature and mathematical methods are used to analyse its data (Creswell, 2003). The quantitative method is clearly aligned with the positivist paradigm.

4.3.3 Mixed Method approach

In this study, mixed methods underpin the research process. The mixed method approach is commonly used in library and information science (Gorman & Clayton, 2005). It draws from the strengths of both the qualitative and quantitative approaches, enabling hard facts as well as deeper meanings to be revealed. The advantages of both methods are

integrated, according to the process of concurrent triangulation. Concurrent triangulation refers to the process by which both quantitative and qualitative data are collected in the same phase, with results integrated at the interpretation stage (Creswell, 2003). Creswell, Klassen and Clegg-Smith (2011) posit that research problems best suited to mixed methods are those in which qualitative and quantitative approaches are inadequate on their own, as is the case in this study. Creswell *et al*. (2011) note that mixed methods in health sciences are used for various reasons, such as: understanding a problem from multiple perspectives in order to enrich the meaning of the singular perspective; to gain a macro picture of a phenomenon such as the workings of hospitals, and to draw information about people at various levels of seniority and education. In this study, such a macro and multi-faceted approach was deemed essential in order to understand the information behaviour of medical doctors and professional nurses in its totality.

The mixed method approach is clearly favoured by many researchers who have studied the information behaviour of various groups of medical staff. Mohamed-Arraid (2011) used questionnaires and interviews to study the information behaviour of Libyan doctors. In the same study concurrent triangulation for data collection was used. Al-Dousri (2009) used focus group and a questionnaire to study the information behaviour of doctors in Kuwaiti government hospitals. In a study of the information needs and information seeking behaviour among health professionals working in public hospitals and health centres in Bahir Dar, Ethiopia, Andualem *et al*. (2013) utilised a questionnaire and observation. Johnson and Onwuegbuzie (2004) believe that the mixed method approach is not a replacement for the qualitative and quantitative approaches but rather an extention of the two methods. Researchers opt for mixed methods to eliminate the weaknesses in each and to improve the overall quality of their data (Johnson & Onwuegbuzie, 2004). Palinkas, Aarons, Horwitz, Chamberlain, Hurlburt and Landsverk (2011) concur when they explain that mixed methods provide a better understanding of a phenomenon than either qualitative or quantitative methods would be able to provide on their own.

Another key advantage of using mixed methods is that the researcher is able to draw data that relate to the complexities of the phenomenon under investigation, through examining respondents' perceptions. The mixed method also helps to determinine relationships between variables (Williams, 2007). According to Creswell and Plano Clark (2011), the advantages of using mixed methods include:

- A better chance of producing more evidence than either the qualitative or quantitative approach alone;
- Questions that cannot be answered by the qualitative or quantitative alone can be answered when using both methods;
- The mixed method narrows the gap between qualitative and quantitative research;
- The researcher is free to use various methods to answer or address the research question;
- The use of multiple theories is possible rather than a focus on only the theories that are typical of each method; and
- The combination of methods compensates for the inherent weaknesses in both.

Moreover, researchers such as Aarons, Fettes, Sommerfeld and Palinkas (2011), Tashakkori and Teddlie (2003), and Landsverk, Chamberlain, Palinkas and Horwitz (2012) have recently called for the use of mixed methods in research, as they believe that some research issues are difficult to address using a single research method.

The information behaviour of medical doctors and professional nurses is an area that has not yet been fully explored in the South African context. In order to obtain the rich data and in-depth understanding that has been sought, the mixed method was therefore deemed best. The literature has demonstrated that there is no one perfect method when doing research and that both qualitative and quantitative methods have their strengths and weaknesess. Combining the two methods means compensating for their respective weaknesses, whilst enhancing the value of each. Ultimately, it is the purpose of the study that dictates which method the researcher chooses. It is clear that if one wants to present a

complex texual description of people's experiences, behaviours, beliefs, opinions, emotions, and relationships with a specific phenomenon, the qualitative method is invaluable. Moreover, at the same time, in order to get facts relating to numbers, the quantitative approach is needed. Thus, the mixed method approach has been used in this study.

4.4 Research design

Several research designs are commonly used in research, such as case studies, experiments and surveys. The case study is a research design aimed at producing an in-depth and multifaceted understanding of a complex issue in a real life context (Crewe, Creswell, Robertson, Huby, Avery & Sheikh, 2011). Experimental research involves the measuring and manipulation of one variable over another (Robson, 1993). According to Pickard (2007), the survey method measures relationships between variables and is concerned with collecting and analysing standardised data. The survey method is not limited to a particular data collection method as various data collection methods can be utilised in survey-based research (Pickard, 2007).

A survey method can be explanatory, descriptive or exploratory, depending on the purpose of the research. Exploratory methods are utilised mainly in situations where relatively nothing is known about the phenomenon or where the research problem is relatively large and complex (Gray, n.d). Exploration is open-ended and allows for a variety of research findings. The explanatory survey seeks to explain the why and when of the situation being investigated and explains the phenomenon under investigation with accuracy and test predictions (Rubin & Babbie, 2009). The descriptive survey is used to establish a factual picture of the phenomenon (Brotherton, 2007). Grimmes and Schulz (2002) observe that a descriptive study is intended to describe an existing distribution of variables with no regard to causal or other factors. Burns & Grooves (2007) explain that the exploratory survey is a tool used to gain new insights and discover new ideas about the phenomenon being investigated. Burns & Grove (2007) also say that with an

exploratory survey, the researcher enters the research field not knowing much about the phenomenon being investigated, and hopes to unearth new data which would explain it.

While the case study approach shares some features with the exploratory survey research, in that both methods seek to provide an in-depth understanding of the phenomenon, the exploratory survey is the better option for this study. Unlike case study research, an exploratory survey studies responses in conjunction with other responses. Rather than an intensive study presenting the exhaustive views of a few, this study intends to generalise findings based on the information uncovered; it seeks to be extensive and to generate a broad understanding of the information behaviour of medical doctors and professional nurses. Miles and Huberman (1994) observe that research designs have different strengths and uses. While some are more deliberate and explicit, others take a more implicit approach. These authors further suggest that as soon as a decision has been made with regard to sampling and data collection methods, it is imperative that an appropriate design is selected for the study. Creswell (2003) points out that the choice of research design will be dictated by the research problem, the aim of the research and resource availability.

This study investigated the information behaviour of medical doctors and professional nurses in hospitals of OR Tambo Health District in Eastern Cape Province of South Africa. The study is broad and the information sought fairly complex. It sought to establish correlations between variables that might exist between medical doctors and professional nurses working in different hospitals, as well as in different units within the same hospital. The complexity of the subject matter, its many variables and the relative novelty of the study in the South African context made the exploratory survey the ideal design for this study.

4.5 Population of study

Five district hospitals for the study were selected out of eight hospitals in the OR Tambo Health District. In each of the hospitals, medical doctors and professional nurses were the

targeted population. The study population also included managerial staff, five **Nursing Service Managers,** one from each hospital, and five **Clinical Managers,** one from each hospital as well. The distribution of the population is shown in table 2.

Table 2: Population of medical doctors and professional nurses

Hospital	**Medical doctors**	**Professional nurses**
Hospital A	19	137
Hospital B	7	68
Hospital C	6	103
Hospital D	10	63
Hospital E	7	76
Total	**49**	**447**

4.6 Sampling procedures

Durrheim and Painter (2006) note that a population is the larger pool from which subjects are drawn and to which study findings may be generalised. Sampling means selecting a few people to represent the larger pool (population), study them, and generalise the result to the entire population. Latham (2007) says that sampling is taking a representative selection of the population and using the data collected as research information. To carry out research it is necessary to do sampling because, unless the population is small, it is impossible to include the whole population; and the practical thing to do is therefore to select a portion of the population and study that portion. Panneerselvam (2004) outline advantages of sampling to include the following: data is collected within a short space of time, costs are saved due to the limited size of samples, and some degree of accuracy is possible as sample sizes are small. In the present case, the data was drawn from the

sample in order to give a reliable indication of the information sought with regard to medical doctors and professional nurses in the whole OR Tambo Health District**.**

Three sampling methods were used to select respondents for the study, namely random and purposive sampling. Random sampling is a sampling process that guarantees that all the possible samples from a population have the same chance of being selected (Barreiro & Albandoz, 2001). Purposive sampling is one of the most common sampling strategies. It identifies study respondents according to pre-selected criteria relevant to a particular research question (Mack et al., 2005). The objective of purposive sampling is to produce a sample that is representative of the population (Battaglia, 2011; Patton, 2002; and Tashakkori & Teddlie, 2003). Purposive sampling allows the researcher to hand pick respondents who will best assist with answering the research questions.

In the present study, purposive sampling was first used to select five district hospitals from the OR Tambo Health District, namely Zithulele Hospital, Dr. Malizo Mpehle Hospital, St Elizabeth Hospital, St Barnabas Hospital and Holy Cross Hospital. The district hospitals were identified through what is known as the Rationalised Service Delivery Platform of the Eastern Cape Department of Health, which designated these hospitals as priority district hospitals for service delivery in the district. They were given the status "priority district hospitals" as they are comparatively large hospitals in terms of their staff complements (doctors and nurses) as well as the package of hospital services they provide. These hospitals were purposively selected in order to get as broad a picture as possible of the information behaviour of medical doctors and professional nurses in the OR Tambo Health District. Purposive sampling was subsequently used to hand pick respondents for key interviews within the five district hospitals. Clinical Managers and Nursing Service Managers were selected to get a managerial perspective of the information behaviour of medical doctors and professional nurses based on their job descriptions.

Simple random sampling was used to select medical doctors and professional nurses to whom survey questionnaires were administered within the five selected district hospitals. The researcher chose a day when nurses converged at one venue for meetings, and handed out the survey questionnaires. The sample size of the respondents was based on Krejcie and Morgan's (1970) table of selecting sample sizes provided below. According to Krejcie and Morgan (1970), for a population of 477 professional nurses (approximately 440 in the table) the corresponding sample size is 205 professional nurses. The survey questionnaires were randomly distributed to 205 professional nurses in the five district hospitals. In each hospital, 40 randomly selected professional nurses were asked to complete the survey questionnaires, with the exception of St Elizabeth Hospital, where 45 professional nurses were selected to fill in the survey questionnaire. The basis of this variation was that the hospital had high nurse staffing level than the rest of other hospitals that participated in the study.

Table 3: Krejcie and Morgan (1970) table for determining sample sizes

Total	*Sample*	*Total*	*Sample*	*Total*	*Sample*
10 ⇒	10	220 ⇒	140	1200 ⇒	291
15 ⇒	14	230 ⇒	144	1300 ⇒	297
20 ⇒	19	240 ⇒	148	1400 ⇒	302
25 ⇒	24	250 ⇒	152	1500 ⇒	306
30 ⇒	28	260 ⇒	155	1600 ⇒	310
35 ⇒	32	270 ⇒	159	1700 ⇒	313
40 ⇒	36	280 ⇒	162	1800 ⇒	317
45 ⇒	40	290 ⇒	165	1900 ⇒	320
50 ⇒	44	300 ⇒	169	2000 ⇒	322
55 ⇒	48	320 ⇒	175	2200 ⇒	327
60 ⇒	52	340 ⇒	181	2400 ⇒	331
65 ⇒	56	360 ⇒	186	2600 ⇒	335
70 ⇒	59	380 ⇒	191	2800 ⇒	338
75 ⇒	63	400 ⇒	196	3000 ⇒	341
80 ⇒	66	420 ⇒	201	3500 ⇒	346
85 ⇒	70	440 ⇒	205	4000 ⇒	351
90 ⇒	73	460 ⇒	210	4500 ⇒	354
95 ⇒	76	480 ⇒	214	5000 ⇒	357
100 ⇒	80	500 ⇒	217	6000 ⇒	361
110 ⇒	86	550 ⇒	226	7000 ⇒	364
120 ⇒	92	600 ⇒	234	8000 ⇒	367
130 ⇒	97	650 ⇒	242	9000 ⇒	368
140 ⇒	103	700 ⇒	248	10000 ⇒	370
150 ⇒	108	750 ⇒	254	15000 ⇒	375
160 ⇒	113	800 ⇒	260	20000 ⇒	377
170 ⇒	118	850 ⇒	265	30000 ⇒	379
180 ⇒	123	900 ⇒	269	40000 ⇒	380
190 ⇒	127	950 ⇒	274	50000 ⇒	381
200 ⇒	132	1000 ⇒	278	75000 ⇒	382
210 ⇒	136	1100 ⇒	285	100000 ⇒	384

Table 4: Number of professional nurses drawn from each hospital (Sources: Field data) (n= 205)

Hospital	Total number of PNs	Respondents per hospital	Percentage per hospital
St Elizabeth	137	45	34.8%
St Barnabas	103	40	38.8%
Holy cross	68	40	58.8%
Malizo Mpehle	76	40	52.6%
Zithulele	63	40	63.4%
Total		**205**	

The census method was also used to select medical doctors in all selected district hospitals. The census method is used where sampling would not provide an accurate generalisation of the whole population (Draugalis & Plaza, 2009). Panneerselvam (2004) says that the census method is the process of obtaining responses from each member of the population, and points out that there is a greater possibility of errors in data when numbers are high**.** Due to the limited number of doctors in the district hospitals, census was an appropriate method for the current study. All forty nine (49) medical doctors working in the five selected district hospitals were selected to participate in this study. This ensured that information was as accurate as possible.

4.7 Data collection procedures

Data collection is an important stage of research as the raw data directly answers the research questions. Data are normally collected using either qualitative or quantitative methods or both. In the current study both methods were employed. According to Burns and Groove (2007), data collection is the stage in which researchers use various techniques such as interviews, questionnaires, and observations to measure the study

variables. Robson (1993) says certain key questions on which strategies to use need to be answered immediately after initial decisions about the "what, why, where and who" of the study have been made clear. The triangulation strategy, using the three data collection methods was adopted in order to acquire a comprehensive understanding of the phenomenon. Patton (2002) observes that the use of multi data collection methods compensate for the potential drawbacks of a single data collection method. Patton further notes that triangulation of data collection methods is also a way of checking the consistency of the findings.

Following attainment of ethical clearance from University of KwaZulu-Natal a team of four research assistants was recruited. They were trained prior to data collection on the objectives, research questions and tools for data collection, criteria for participation in the study as well as how to organise and conduct in-depth interviews. They were taught how to be effective in note taking and ethical issues when interviewing participants. Following the training of the research assistants, the process of data collection was started. Qualitative data collection took place from the 13th January 2016 to 19 February 2016. Interviews were conducted from 22nd February to the 29th February. Observation was done from 1st March 2016 to 6th April 2016.

4.7.1 Questionnaire

A questionnaire refers to a "written list of questions where respondents read the questions and write down answers as expected by the researcher" (Kumar, 2005). Johnson and Christensen (2012) observe that questionnaires are classified according to the questions asked. Questionnaires with open-ended questions are qualitative questionnaires, while those with close-ended questions are quantitative questionnaires (Johnson and Christensen, 2012). Guided by the literature and personal experience, the researcher designed a structured questionnaire that solicited data with quantifiable questions on the information behaviour of medical doctors and professional nurses. The questionnaire included questions soliciting demographic information and much thought went into designing the questionnaire to ensure that questions were specific enough to obtain the quantitative information the study required.

A closed-ended, self- administerd questionnaire was used to collect quantitative data on questions relating to, among others, roles of medical doctors and professional nurses in district hopitals, the tasks associated with their jobs, and the knowledge, and perceptions of medical doctors and professional nurses regarding their information behaviour. For the questionnaire used to collect data in this study (**see Appendix 2)**. The questionnaire was administered to all selected medical doctors and professional nurses. The questionnaire was chosen because it facilitated easy data collection from a large number of respondents at a relatively low cost. The questionnaire also allowed medical doctors and professional nurses to complete it at their own time. The questionnaire was close-ended to allow for the collection of standardised data that would be easy to interpret and analyse due to their quantifiable nature. Bulmer (2004) asserts that the questionnaire is a well established tool within the field of social sciences. It is not used for quantitative purposes only but can be used to glean qualitative information too. For instance one may use it to find out information related to the social characteristics of respondents and their past and present behaviour, including their beliefs and attitudes.

4.7.2 Interviews

MacNamara (2009) describes the interview as a conversation happening between two or more people, where the interviewer asks questions from the interviewee with the intention of soliciting information for a specific purpose. MacNamara further explains that interviews can be an important tool when a researcher wants to follow up on responses obtained from a questionnaire. According to Boyce and Naele (2006), interviews are a qualitative research strategy, involving rigorous, one-on-one conversations with a small number of respondents in order to discover their thoughts and views on a specific subject. Turner (2010) identifies three interview approaches that are used in research, namely, the informal conversational interview, the general interview guide strategy, and the standardised open-ended interview. According to Turner (2010), the informal conversational interview is unstructured and can be difficult to analyse, as different responses will demand different analyses. The interview guide provides a list of

questions to be explored to ensure that every respondent is interviewed following the same pattern of questions. With this type of interview, the researcher is free to ask questions that will expand on the topic under investigation. With standardised open-ended interviews, the questions are specific in what they seek to find (Turner, 2010).

For this study, face to face, in depth open-ended interviews were used to collect qualitative data from nursing service managers and clinical managers. For interview guide (**see Appendix 1)**. Each of the five district hospitals has one nursing service manager, who is in-charge of all nurses in the district hospital and all five were interviewed. Similarly, each of the five district hospitals has a doctor (the clinical manager) in charge of other doctors, and all five were interviewed. The open–ended interview allowed the respondents to answer questions in their own words. The interviews were video recorded to capture data accurately. Interviews were guided by a written interview guide and solicited managerial perceptions, opinions, and experiences; contributing a rich vein of data to augment the quantitative data from the questionnaire. Questions asked during interviews were aimed at gaining an understanding of policies that govern the provision and use of information by medical doctors and professional nurses; the availability or otherwise suitable infrustructure (money and people) to facilitate the provision of information, and the availability or otherwise capacity building programmes to improve existing information systems. During interviews the researcher was able to probe and adjust the flow of the questions where necessary. Mack *et al*. (2005) say that in-depth interviews involve getting a graphic picture of the topic being investigated from respondents who are considered experts. In-depth interviews are an effective method of attaining the respondent's opinions, feelings and experiences regarding the phenomenon being investigated. Researchers engage in in-depth interviews in order to learn as much as they can about the research topic (Mack *et al*., 2005).

4.7.3 Observations

According to Driscoll (2011), observation involves "observing and measuring the world around you, including people and other measurable events". Observation provides a researcher with an information-rich account of the conversations and interactions of the group being investigated (Bresciani, Oakleaf, Kolkhorst, Nebeker, Barlow, Duncan, & Hickmott, 2009). Observational study is best used for obtaining direct information from the respondents about who they are and the things they do, including their on-going behaviour within their personal contexts (Godwin & Chambers, 2009). Sharp and Tustin (2003) say that observation studies are distinctive in that the researcher directly observes the behaviours of respondents instead of relying on self-reported information. It assists in overcoming discrepancies between what respondents say happens and what actually happens (Sharp & Tustin, 2003).Observation allows the researcher to observe a certain aspect of the respondents with as much objectivity as possible and record what has been observed (Williams, 2007).

In this study, observations were used to complement data from the questionnaire and interviews, and to verify the opinions that respondents had in their interviews as well as the questionnaire. Medical doctors and professional nurses were observed inside the wards; while they went about their daily routines of seeing to patients. Observation was guided by an observation guide (see Appendix 3), which outlined behaviours that needed to be observed. Observational study is categorised into two kinds; respondent and non-respondent. Mack *et al*. (2005) say that respondent observation is unique in that the researcher has to approach respondents in their own setting instead of respondents having to come to the researcher. Respondent observation takes place in settings that are presumed to be relevant to research questions. Observing and participating at the same time enables the researcher to understand the extent and complexity of human experiences. Significant factors that were not known before the commencement of research can be unearthed through use of respondent observation. These strengths of respondent observation compensate for the limitations of questionnaires and interviews (Mack *et al*., 2005). Observation often uncovers routine or unconscious behaviours of which respondents themselves may be unaware.

Mack *et al.* (2005) allude to three disadvantages of using respondent observation: it is a time consuming process; it can be overly subjective, in that researchers may fail to record what they actually see and record instead their interpretation of what they see – sometimes incorrectly; and lastly, it can be difficult to record what is happening while observing and participating at the same time. According to Price and Oswald (2006), non-respondent observation involves observing behaviours within the natural environment, without any form of participation by the observer. Non-respondent observation was preferred for this study because it is less intrusive than respondent observation. During non-respondent observation, detailed field notes were recorded. After each ward observation, the researcher reflected on the activities of the day, to see if the observed behaviour corresponded with the observation guide.

According to Garwood (2006), observation can be used in two ways in research, structured and unstructured. Structured observation is systematic and involves recording what is being observed. Unstructured observation, on the other hand, is not restricted by checklists or coding schemes (Garwood, 2006). The current study opted for structured observation to enable the researcher to record behaviours following an observation guide. The researcher had key points to notice as guided by the research questions; therefore, structured observation was appropriate. According to Cooper, Lewis and Urquhart (2004), both respondent and non-respondent observation has been used to study the information behaviours of various groups of people in their work environments. Several studies have used observation as either a primary method of data collection or in combination with other methods such as questionnaires and interviews. Some of the researchers who have used observation include: Lamox, Lowe, Logan and Detlefse (1999), who used questionnaires, interviews and observation to study the information behaviour of medical oncologists in the United States of America; Gonzelez-Gonzelez *et al.* (2007) who used observation to study the information needs and information seeking behaviour of primary care physicians in Spain; and Andualem et al. (2013) who used questionnaires and observation to study the information needs and information seeking behaviour among health professionals working in public hospitals and health centres in

Ethiopia; Baro, Onyenania and Oseheni (2010) who used questionnaire, interviews and observation to study information seeking behaviour of undergraduate students in the humanities in three Nigerian universities.

Observation research (respondent or non-respondent) can be overt or covert. Overt means that the subjects being investigated are aware that the observer is a researcher, while covert means that the subjects of the investigation are unaware that they are being observed (Brewer, 2013). The current study opted for non-respondent overt observation. This means that although the researcher was not participating in the activities, respondents were still aware of the researcher's presence. Overt observation was the obvious choice, as the researcher was already known to some of the study respondents and had to explain her presence in that environment. The researcher developed an observation guide, which specifies the categories of behaviours to be observed. The guide was developed in line with the research questions. Observation happened parallel with questionnaire administering and took place in both outpatient and inpatients wards. It focused only on the behaviour of medical doctors and professional nurses, not on patients. A research assistant with a medical background was used to assist with recording and explaining some of the medical terms in order to make sense of what was observed.

Observation data may be collected using video recording or paper-based means, or both. For this study, observations were recorded on the observation guide sheet. This paper-based form of recording, involving the writing of field notes, was felt to be less intrusive than the use of video. The researcher and research assistant randomly visited the wards to observe activities taking place at the time, recording as they happened. Medical doctors and professional nurses as were observed as they performed their duties over seven days, with the observers covering one ward per day. One set of observations was performed for each ward and follow-ups were made where clarification was needed for certain behaviours. In the in-patient wards (Maternity, Paediatric, Male medical, Female medical, Male Surgical, Female Surgical) observation happened in the morning; this is

the time when medical doctors and professional nurses do their ward rounds. When the researcher schedule required observing activities of the Outpatient ward (OPD) and Casualty, afternoon was used, as this is when medical doctors and professional nurses made contact with patients as they arrived at the hospital.

4.8 Data analysis strategies

Field (2009) says that once data are collected, data analysis has to follow in order to make sense of the findings and reach conclusions about the investigated phenomenon**.** Both qualitative and quantitative data were analysed in order to understand the information behaviour of medical doctors and professional nurses in the five selected district hospitals in the OR Tambo Health District**.**

4.8.1 Qualitative data

Following the transcribing of notes which allowed the researcher to become acquainted with the data, both interviews and observations were analysed in three coding stages: open coding (reading of data several times), involving circling words and phrases that describe the information behaviour of medical doctors and professional nurses, selective coding (identifying core variables and coding data that relates to core variables) and theoretical coding (developing a theory through emerging themes about the phenomenon being investigated). This process was done using an inductive approach, to allow the research findings to emerge from dominant themes of data (Nieuwenhuis, 2007). In this coding process, raw data were initially examined and coded through a process, which fractures data into discrete threads of datum, which were then collated to form categories of similar phenomena. The approach was chosen as it allowed the researcher constantly compare emerging themes. The approach divided data into a set of themes and allowed for scrutiny of commonalities between the themes that described the phenomenon. The emerging themes were summarised in descriptive words and phrases to facilitate an understanding of what was emerging. This approach provided a systematic way of

analysing data from medical doctors and professional nurses and helped identify differences between the two groups. Using these coding stages also allowed for comparison of data from medical doctors and professional nurses in different hospitals.

4.8.2 Quantitative data

Following coding, the data was fed into a spreadsheet, followed by cleaning to ensure accuracy. The data was then recorded into the Statistical Package for Social Sciences (SPSS), version 19 for window (SPSS Inc., Chicago, Illinois, USA) for statistical analysis. Descriptive statistics involving percentages, frequency tables, histograms, and pie charts were used to present the results. Table 5 maps the research questions to data sources and data analysis strategy.

Table 5: Research questions, respondents, data sources and data analysis strategy

Research question	Respondents	Data sources	Data analysis Strategy
What roles do medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District perform?	Doctors, nurses, Nursing Service and Clinical Managers	Survey questionnaire In-depth interviews	SPSS; Qualitative data analysis
What tasks do medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District perform?	Doctors, nurses, Nursing Service and Clinical Managers	Survey questionnaire In-depth interviews	SPSS; Qualitative data analysis
What are the information needs of medical doctors and professional nurses district based?	Doctors, nurses, Nursing Service Managers and Clinical Managers	Survey questionnaire In-depth interviews and observation	SPSS; Qualitative data analysis
What are the channels and sources of information preferred by district hospital-based medical doctors and professional nurses	Doctors and Nurses Nursing Service Managers and Cinical Managers	Survey questionnaire In-depth interviews and observation	SPSS; Qualitative data analysis
What factors facilitate or hinder information seeking of district hospital based medical doctors and professional nurses?	Doctors, nurses Clinical Managers; Nursing Service Managers;	Survey questionnaire In-depth interviews; and observation	SPSS; Qualitative data analysis

Although the analysis of qualitative and quantitative data happened independently of each other, data for both methods were integrated in order to draw conclusions from both approaches as part of the mixed method. Creswell and Plano Clark (2011) note that, with mixed method studies, the integration of qualitative and quantitative data is the crucial

activity after data analysis. However, this aspect is often disregarded. In this study the researcher analysed quantitative and qualitative data separately, then integrated both sets of data, according to the triangulation method. With both sets of data integrated, the researcher was able to understand the information behaviour of medical doctors and professional nurses.

4.9 Validity and reliability

To ensure validity, triangulation was used. Triangulation is typically a strategy for improving the validity and reliability of research findings where a researcher searches for convergence among multiple and different sources in order to form themes or categories in a study (Creswell & Miller, 2000). Triangulation strengthens both quantitative and qualitative approaches (Patton, 2002). To improve the reliability of data instruments, tools (questionnaire, interviews, and observations) that have been used in previous research studies were used to inform the content in line with the research questions. The reliability of data was further improved by the use of research assistants to assist with data collection**.** According to Flick (2009, p386) "the quality of recording and documenting data becomes a central basis for assessing their reliability and that of succeeding interpretations. One starting point for examining this is the field notes in which researchers document their observations. Standardisation of notes increases the reliability of such data if several observers collect the data".

Questionnaires were chosen to derive evidence of relationships between variables, whereas interviews and observation were chosen to provide insights about the data. The interviews and observation guides were also designed in line with the objectives of the study. The questionnaire was only finalised once the researcher had completed cognitive testing with five subjects for medical doctors and five subjects for professional nurses from a district hospital, which did not form part of the study.

4.10 Ethical Considerations

The researcher obtained ethical clearance to conduct this study from the University of KwaZulu-Natal Ethics Committee (**see Appendix 4**). For ensuring ethical compliance, access to the research site and consent to conduct research was obtained from the Eastern Cape Department of Health Research Committee (**see Appendix 5**). Before initiating the interviews, questionnaires and observations, all respondents were asked to sign informed consent forms. The consent forms (**see Appendix 6)** detailed the purpose of the research, what was expected of research respondents and any risks and benefits that might accrue from participating in the study. Participation in the study was completely voluntary and confidentiality and anonymity were maintained throughout. No personal identification was solicited for the purposes of the study. Respondents were assured of their right to withdraw from participating in the study. With regard to observation, respondents were asked to give an indication if they felt the presence of the researcher was interfering with their work activities. The respondents were also assured that all data collected was to be used only for the purposes of the study after which it would be destroyed.

4.11 Summary

This methodology chapter gave a review of the three major philosophical paradigms that underpin research and explained in detail the differences between the quantitative and qualitative approaches or methods in research. The advantages and disadvantages of both approaches were adduced, with many references to the findings of other studies.

The post-positivist paradigm was used to underpin the study because it fostered a focus on both quantitative and qualitative data, and is most commonly used in library science. With the post-positivist paradigm underpinning the study, the mixed method approach was deemed the best approach or strategy, allowing for the combined strengths of the qualitative and quantitative methods. Examples were given of studies in other countries where mixed methods were used; involving questionnaires, interviews and non-respondent based overt observation.

A variety of research designs were examined including case studies, experiments, and surveys. Among these, the exploratory survey was chosen as the most suitable design for the study. The questionnaire, interviews and observations formed part of this survey. Of these, the questionnaire was quantitative in nature, while the open-ended, qualitative interviews and non-respondents based overt observation filled in the many details and nuances that the questionnaires could not cover. The question of how to select the relevant population for research was determined by the kinds of answers sought. For this reason, combinations of both random and purposive sampling techniques were used. Five district hospitals in the OR Tambo Health District were purposively selected. For the questionnaire, simple random sampling was used for nurses, with 205 nurses selected from 477. The number selected was based on the recommendations of Krejcie and Morgan's (1970) table for sample sizing. For doctors, the census method was used to select all forty-nine doctors in the five hospitals to participate in the questionnaire, as the number was small enough to be managed.

The interviews provided the qualitative data. Total of ten management staff (five doctors and five nurses, one of each from each hospital) were selected to participate in in-depth, open-ended interviews. These yielded much information that was useful and more detailed than the information yielded by the questionnaires. An interview guide gave structure to the interviews, but the researcher was free to deviate from it when necessary. For interviews, purposive sampling was used to focus the interviews on management staff only. Observation took place over a week per hospital, observing nurses and doctors in the wards of the five selected district hospitals. Observation allowed the researcher and her assistants to observe whether claims made in the interviews and questionnaires were accurate and to get the kind of feeling and sense of hospital life that these previous tools may have been unable to give.

In combination, and after being subject to the process of data analysis described above, these three sources – the questionnaire, interviews and direct observation - provided a comprehensive picture of the information behaviour of medical doctor and professional

nurse in the five selected district hospitals in OR Tambo Health District. Triangulation ensured that the findings were valid and reliable. Throughout the research period, ethical protocols were adhered to, with respondents' confidentiality and privacy respected.

CHAPTER FIVE

DATA ANALYSIS AND PRESENTATION OF FINDINGS

5.1 Introduction

This chapter presents the findings of the study. The findings are organised around the research objectives. The findings from both qualitative and quantitative data analyses are integrated. The qualitative findings are based on thematic analysis of data collected through in-depth interviews with clinical managers and nursing service managers and observations while quantitative findings are based on the survey questionnaire administered to medical doctors and professional nurses. The study sought to address the following research questions:

1. What roles do medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District perform?
2. What tasks do medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?
3. What are the information needs of medical doctors and professional nurses in the five selected district hospitals?
4. What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals?
5. What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals?

5.2 Demographic profile of the respondents

Four out of five nursing service managers were females and their ages ranged from 53 to 61 years. All clinical managers were males and aged between 45 and 52. Out of the five clinical managers, two had postgraduate managerial diplomas in addition to their medical qualifications. All targeted respondents were available for interviews, translating to

131 (100%) response rate. Similarly, 167 out of 205 questionnaires given to both medical doctors and professional nurses in the hospitals were returned, translating to a response rate of 81.5%. Tables 6 and 7 respectively present the demographic profiles of the respondents. Table 8 shows the profile of participants observed.

Table 6: Demographic Profile of Nursing Service Managers (NSM) (N=5) (Source: Field data)

Hospital	**Gender**	**Age**	**Qualification**	**Area of Expertise**	**Years of experience**
A	Female	61	Diploma in Nursing Management and Nursing Education	Maternity, Theatre, Nursing management	30
B	Female	60	Nursing Diploma	HRD, Lecturing, NSM and Maternity	36
C	Female	59	B.A. Nursing Sciences	High care, Maternity, Paediatrics	34
D	Male	53	Bachelor of Nursing Sciences	Management, Clinical programs	29
E	Female	60	Diploma in Nursing Management and Nursing	Maternity, Theatre, Nursing management	33

			Education		

Table 7: Demographic profile of clinical managers (N=5) (Source: Field data)

Hospital	Gender	Age	Qualification	Area of Expertise	Years of experience
A	Male	45	MBCHB – post Grad	General Practitioner	18
B	Male	40	MBCHB and MSc in primary Care	General Practitioner	16
C	Male	44	MBCHB	General Practitioner	13
D	Male	52	MBCHB and post graduate diploma in management of health services	General Practitioner	22
E	Male	44	MBBS and post Graduate diploma in HIV Management	General Practitioner	22

Table 8: **Health professional staff observed in the wards (n=184) (Source: Field data)**

Ward	Number of respondents working per	Hospital name

	Shift	
OPD	2 per consulting room	A
	2 per consulting room	B
	2 per consulting room	C
	2 per consulting room	D
	2 per consulting room	E
Casualty	1 MD, 1 clinical associate, 2 PNs and 4 staff nurses	A
	1 Clinical associate, (middle level medical professionals found in some selected rural hospital-also called physician assistants in USA. They complement the shortage of medical doctors especially in rural public hospitals in RSA), 1 MD, 2 PNs, 2 staff nurses and 1 nursing assistant	B
	1 MD, 1 PN, and 5 staff nurses.	C
	1 MD, 1 clinical associate, 2 staff nurses and 2 nursing assistants	D
	4 MD, 5 PNs and 4 staff nurses	E
Maternity	2 PN and 2 staff nurses	A
	1 PN, 3 staff nurses and 1 nursing assistant	B
	2 professional nurses, 2 staff nurses	C
	2 PNs and 2 staff nurses	D

	2 PNs and 2 staff nurses.	E
Paediatrics	3 PNs and 2 staff nurses and 1 nursing assistant.	A
	3 PN, 3 staff nurses and 1 nursing assistant	B
	2 PNs and 4 staff nurses	C
	5 PNs, 3 staff nurses and 2 nursing Assistants	D
	3 PNs and 3 staff nurses	E
Medical	2 PNs, 3 staff nurses and 2 nursing	A
ward	Assistants	
	1 PN, 3 staff nurses and 1 nursing assistant	B
	2 PNs, 2 staff nurses and 2 nursing Assistants	C
	3 PNs, 1 staff nurse and 2 nursing Assistants	D
	4 PNs, 4 staff nurses and 3 nursing assistants and a 1 medical doctor were Observed	E
Surgical ward	2 PNs, 3 staff nurses and 2 nursing Assistants	A
	1 PN, 3 staff nurses and 1 nursing assistant	B
	2 PNs, 2 staff nurses and 2 nursing Assistants	C

	3 PNs, 1 staff nurse and 2 nursing Assistants	D
	4 PNs, 4 staff nurses and 3 nursing assistants and a 1 medical doctor were Observed	E
High care	2 doctors stationed in the ward and 3 PNs who are trained in ICU	E

The results of the survey show that the majority of the respondents were South African citizens accounting for 157 (96.32%), while non South African citizens accounted for 6 (3.68%) (See figure 13).

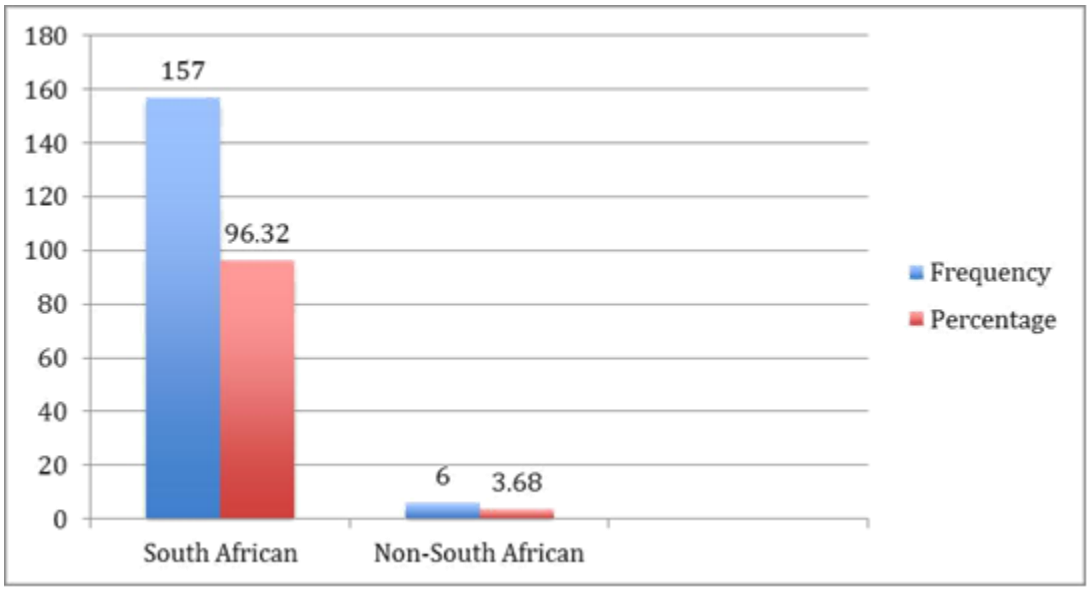

Figure 13: Distribution of respondents based on nationality (n=163) (Source: Field data)

The results of the survey showed that the respondents comprised of 132 females (82.5%) and 28 males (17.5%) (See figure 14).

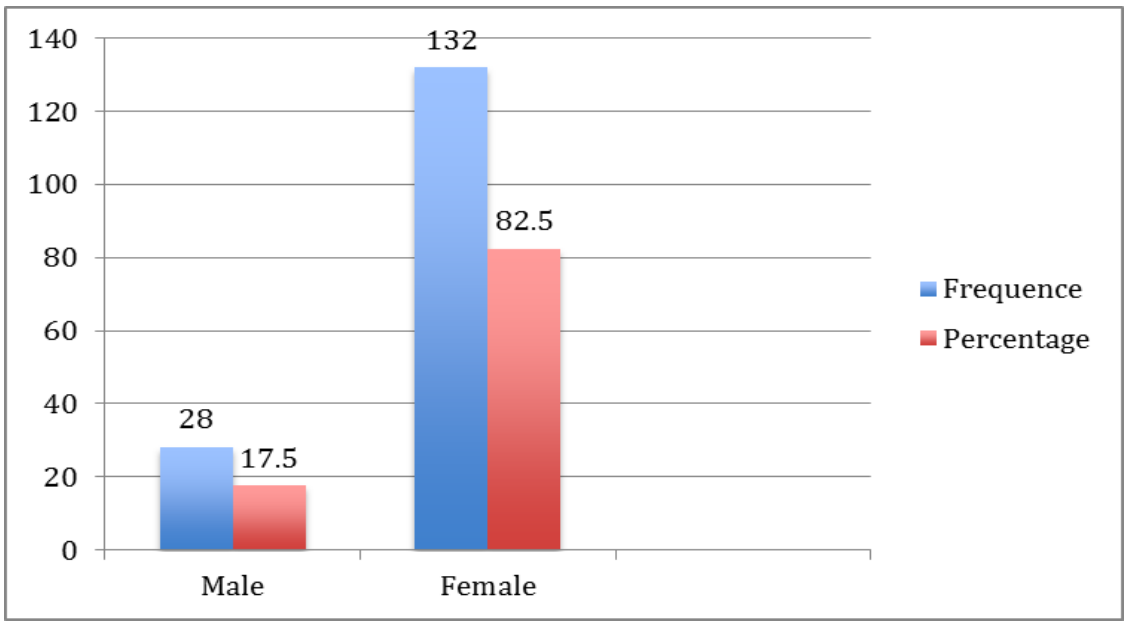

Figure 14: Distribution of respondents based on gender (n=160) (Source: Field data)

The results of the survey showed that the age profile consisted of 33 (21.85%) of respondents who were less than 30 years; 31(20.53%) of respondents who were between 31 and 37 years; 28 (18.54%) of respondents who were between 38 and 44 years; 29 (19.1%) of respondents who were between 45 years and 55 years and 30 (19.87%) of respondents who were over 55 years respectively (See figure 15).

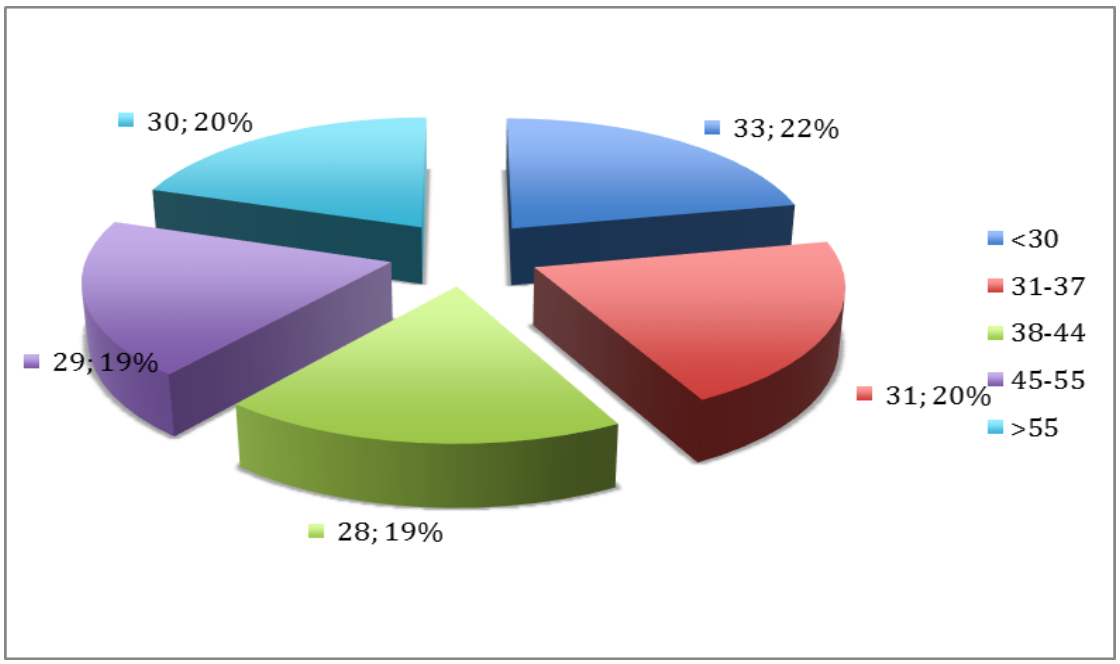

Figure 15: Distribution of respondents based on age (n=151) **(Source: Field data)**

The results of the survey further revealed that the majority of the respondents were professional nurses accounting for 138 (86.25%) and 22 (13.75%) being medical doctors (See figure 16).

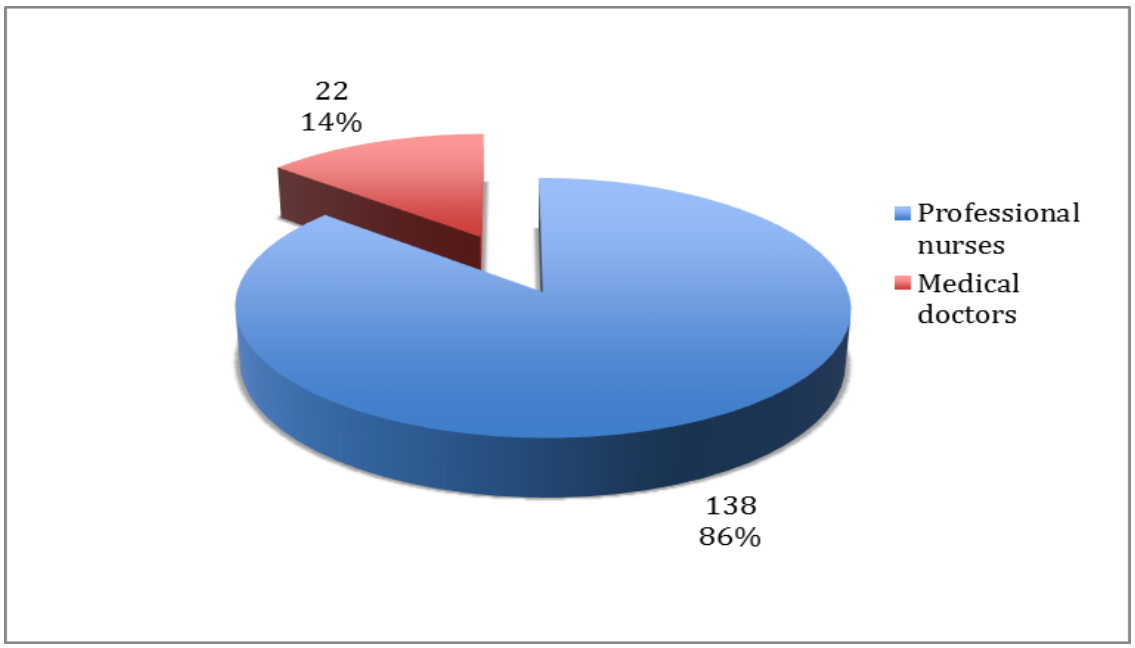

Figure 16: Distribution of respondents based on the designation (n= 160) (Source: Field data)

According to the survey, those respondents who had less than 3 years of service were (41; 29.71%), between 4 and 7.5 years (28; 20.29%) and between 7.5 and 18 years of service (36; 26.09%) (See Figure 17).

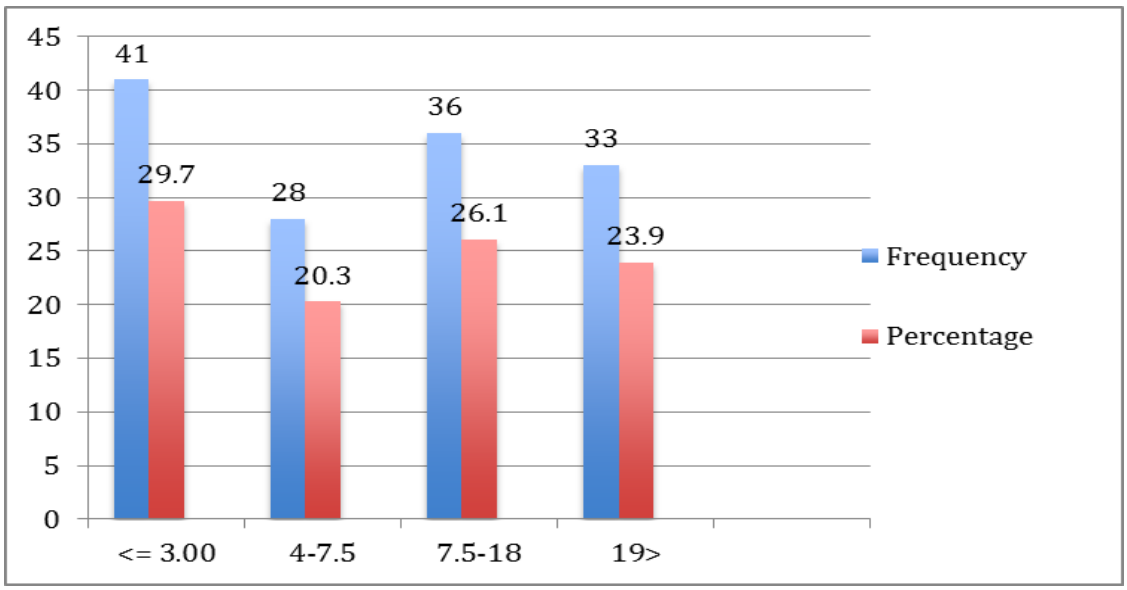

Figure 17: Distribution of respondents based on the years in service (n=138)

(Source: Field data)

Figure 18 shows that the survey drew respondents from five hospitals: Dr. Malizo Mpehle Hospital 47 (28.84%), St Barnabas Hospital 36 (21.82%), Holy Cross Hospital 23 (13.9%), St Elizabeth hospital 28 (16.97%) and Zithulele Hospital 31 (18.79%).

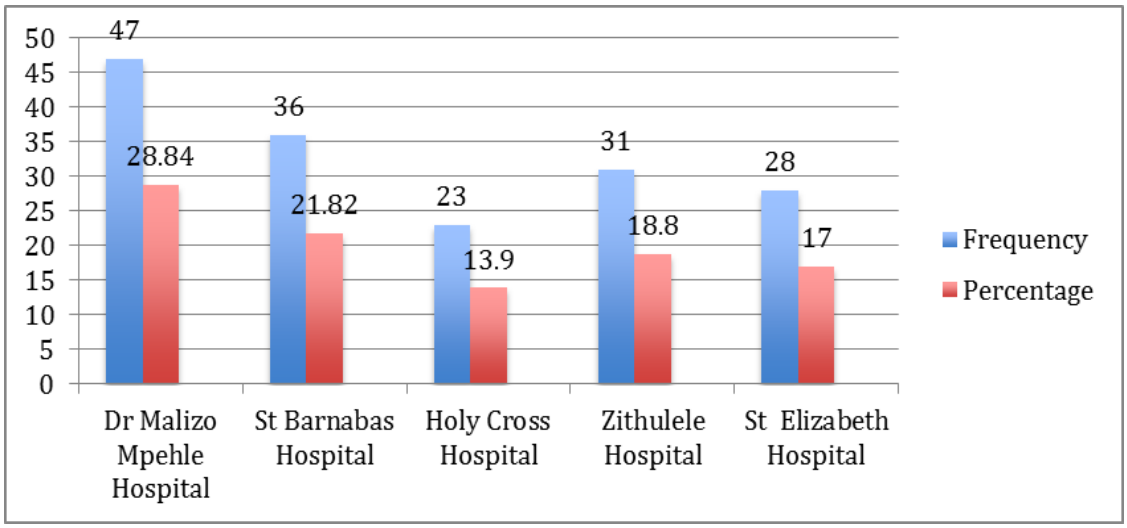

Figure 18: Distribution of respondents based on hospital of affiliation (n=165)

(Source: Field data)

Regarding the operational status of respondents, the results in table 9 show that the majority were professional nurses 120 (75%), followed by medical doctors 19 (11.9%). The 120 professional nurses exclude other professional nurses such as infection control nurse, quality assurance nurse, nursing operational manager and nursing service manager who work in additional capacities in the organisation.

Table 9: Distribution of respondents according to the professional status (n=160) (Source: Field data)

Operational Status	**Frequency**	**Percentage**
Clinical Manager	2	1.25
Medical Officer	19	11.88
Nursing Operational Manager	8	5.00
Nursing Service Manager	1	0.63
Quality Assurance Officer	1	0.63
Nursing Area Manager	7	4.38
Infection Control	2	1.25
Professional Nurse	120	75.00

The respondents were asked to respond to the question, *where are you working*? According to the survey, the respondents were working in medical wards 23 (14.74%), surgical wards 14 (8.97%), maternity wards 41 (26.28%), outpatient departments 25 (16.02%), casualty departments 15 (9.62%), paediatric wards 12 (7.69%) and hospital theatres 26 (16.67%) (See table 10).

Table 10: Distribution of respondents based on area of work (n=156) (Source: Field data)

Area of work	Frequency	Percentage
Surgical wards	14	8.97
Medical wards	23	14.74
Maternity wards	41	26.28
Outpatient departments	25	16.02
Casualty departments	15	9.62
Paediatric wards	12	7.69
Theatres	26	16.67

5.3. Findings on main research questions

This section presents findings based on the four research questions that were investigated in this study.

5.3.1 What roles do medical doctors and professional nurses perform in the five selected district hospitals of OR Tambo health district?

The survey was augmented by in-depth interviews administered to clinical managers and nursing service managers. In addition, the researcher carried out observations. The purpose of this question was to get an understanding of the roles that medical doctors and professional nurses perform in the five selected hospitals. As observed by the researcher, medical doctors and professional nurses were responsible for patient care in various departments of the hospitals surveyed. In each hospital it was observed that nurses were

allocated to work in outpatient, casualty, medical wards, surgical wards, paediatrics, theatre, and maternity departments to provide patient care.

The roles of medical doctors and professional nurses are further illustrated in this verbatim response by clinical manager D:

"The primary objective of a medical officer in this institution is to treat patients, depending on which domain you are in. If you are in outpatients, you manage patients as outpatients, in theatre you operate on patients. Also part of our jobs, especially that of my senior colleagues is to mentor the younger doctors and medical students. These are the responsibilities of a doctor, but the primary responsibility is to treat patients that come in give a quote above to this institution".

Clinical manager B emphasised the role played by medical doctors in the hospital pointing out that:

"*On a daily basis, each one of us is allocated a ward in which to conduct a ward round, time slot for OPD after the ward round to see outpatients who are coming from the clinics or back for review*".

According to the nursing service managers and clinical managers, medical doctors, and professional nurses perform additional roles such as teaching, training, research, and administration. In the words of clinical manager A:

"*Their responsibilities include administration, research, teaching, mentoring, and conducting seminars and in-service training for junior health workers"*.

Similarly nursing service manager A noted:

"Nurses need to research because medicine evolves. For example, information on HIV changes every 6 months. Nurses must be informed to keep up with the changes in medicine. Now we are talking of the Zika virus, this is new to us; information is needed to ensure that as nurses we can deal with such emerging and new diseases things".

It was also noted by nursing service manager E that:

"*PNs are expected to teach less experienced junior nurses and those who operate at lower levels in the hospital hierarchy, such as staff nurses and nursing assistants"*.

In addition, clinical manager B had this to say:

"The responsibilities of medical doctors include comprehensive medical and surgical services to the community. Teaching and mentorship for medical students and clinical associates who come here for Integrated Longitudinal Clinical Clerkship are also at the core of a doctor's responsibilities. Doctors also have a responsibility towards social services, e.g. forensic investigation. They work with police to collect evidence in cases of rape and drunken driving as well as providing evidence of government grants eligibility; also educating communities about health issues, all done in the quest to improve the lives of communities".

The results from interviews and observations confirmed the findings of survey, where respondents reported that they were responsible for taking care of patients in male and female medical wards 50(30.5%), male and female surgical wards 45(27.5%), maternity wards 45 (27.4%), outpatient departments 33(20%), casualty departments 28(17.1%), paediatric wards 26(15.8%), and hospital theatres 20(12.1%) (See results presented in table 11).

Table 11: Roles performed by medical doctors and professional nurses (Source: Field data)

Role	**Yes (n)**	**%**
Responsible for the paediatric ward (n=165)	26	15.8
Responsible for theatre (n=165)	20	12.1
Responsible for the male medical (n=164)	30	18.3
Responsible for female medical (n=164)	20	12.2
Responsible for the maternity ward (=164)	45	27.4
Responsibility of taking care of male surgical (n=164)	27	16.5
Responsible for female surgical (n=164)	18	11

Role	Yes (n)	%
Responsible for the outpatient department (n= 165)	33	20
Responsible for the casualty department (n= 164)	28	17.1
Overall doctor-in-charge (n= 163)	6	3.7

5.3.2 Tasks performed by medical doctors and professional nurses

The respondents were asked to state the tasks performed by medical doctors and professional nurses. The purpose of this question was to get an understanding of the tasks associated with the roles of medical doctors and professional nurses in the five selected hospitals.

The analysis of data showed that about 80% of survey respondents reported that their tasks included *"always"* 53 (52.5%) or "*often"* 26 (25.7%) seeing patients in the outpatient's department. Only 22 (28.1%) of the respondents reported that they "*seldom*" see patients in the outpatient departments.

For the respondents who worked in the casualty during the day, majority reported that they "*always*" 46 (48.4%) and "*often*" 25 (26.3%) *see* patients in the casualty department, compared to those 24 (25.3%) who "*seldom"* see patients in the casualty department during the day. Over two-thirds of respondents reported that they *"always*" 34 (37.8%) and "*often"* 29 (32.2%) see patients in the casualty after hours.

The respondents who performed ward rounds to see patients admitted in the wards noted they "*always"* 72 (58%) or "*often*" 28 (22.6%) perform ward rounds to see patients admitted to the hospital and transferred to wards. Only 24 (19.4%) reported that they "*seldom*" perform ward rounds.

Less than half of the respondents reported to "*always*" 29 (36.25%) or "*often"* 9 (11.25%) performed caesarean sections and more than 50% "*seldom"* perform caesarean sections. In addition, almost two-thirds of the respondents "*always"* 40 (38.4%)/ "*often*"

27 (26%) performed minor procedures, whereas 37 (35.6%) "*seldom*" perform minor procedures.

The analysis of data revealed that about 38 (41.3%) of respondents *"always*", 6 (6.5%) "*often*" and 48 (52.2%) "*seldom*" performed blood investigations for diagnosis and treatment of patients. The results also showed that the majority 53 (61.6%) "*seldom*" request and interpret x-ray investigations to diagnose patient illnesses compared to 27 (31.4%) who *always* and 6 (7%) who *often* did.

About two-thirds of respondents reported that their daily tasks "*always*" 44 (50%) and "*often*" 12 (13.6%) included prescribing treatment for patients, while 32 (36.4%) of the respondents reported that they "*seldom*" prescribed treatment for sick patients.

The majority 122 (79.7%) of the respondents reported that they "*always*" educated their patients about their illnesses with about 22 (14.4%) feeling that they "*often*" performed the task of educating their patient about illnesses. Another majority of the respondents reported that they "*always*" 117 (79.6%) and "*often*" 15 (10.2%) gave treatment to the patients. In addition, almost all respondents reported that they "*always"* 87 (66.9%) and *"often"* 25 *(*19.3%*)* reviewed progress of their patients who were on treatment.

The results further revealed that over 80% of the respondents reported that they either "*always*" 71 (58.7%) or "*often*" 22 (18.2%) teach health workers and health science students in the selected hospitals. In addition, about 34 (43.0%) of the survey respondents were "*always"* and *"often"* 14 (17.7%) involved in the reviewing of mortality statistics compared to 31 (39.2%) whose tasks "*seldom"* included reviewing mortality statistics. Furthermore, less than 60% of the survey respondents reported that they "*always"* 48 (39.3%) and "*often*" 21(17.2%) conduct review of folders compared to 53 (43.4%) who *seldom* take part in folder reviews. The results also revealed that about 60% of the respondents "*always"* 48 (41.3%) and "*often*" 22 (19.09 %) reviewed complaints made by patients compared to 46 (39.7%) who *seldom* reviewed patients' complaints. Table 12

below shows distribution of respondents according to the tasks they performed in the hospital.

Table 12: Tasks performed by medical doctors and professional nurses

Task	Always (n)	%	Often (n)	%	Seldom (n)	%
Seeing outpatients during the day (n=101)	53	52.5	26	25.7	22	28.1
Seeing patients at the casualty section during the day (n=95)	46	48.4	25	26.3	24	25.3
Seeing patients in casualty after hours (n=90)	34	37.8	29	32.2	27	30.0
Performing ward rounds to see patients admitted in the wards (n=124)	72	58	28	22.6	24	19.4
Performing Caesarean Sections (n=80)	29	36.25	9	11.25	42	52.5
Performing minor procedures (n=104)	40	38.4	27	26.0	37	35.6
Requesting and interpreting blood investigations to diagnose patient illnesses (n=92)	38	41.3	6	6.5	48	52.2
Requesting and interpreting X-ray investigations to diagnose patient illnesses (n=86)	27	31.4	6	7.0	53	61.6
Prescribing treatment for sick patients (n=88)	44	50.0	12	13.6	32	36.4
Educating patients about their illnesses (n=153)	122	79.7	22	14.4	9	5.9
Giving treatment to patients (n=147)	117	79.6	15	10.2	15	10.2

Reviewing progress of patients on treatment (n=130)	87	66.9	25	19.3	18	13.8
Teaching health workers and heal sciences students in the hospital (n=121)	71	58.7	22	18.2	28	23.1
Reviewing mortality statistics (n=79)	34	43.0	14	17.7	31	39.2
Conducting folder reviews (n=122)	48	39.3	21	17.2	53	43.4
Reviewing complaints made by patients (n=116)	48	41.3	22	19.0	46	39.7

The findings on this question therefore show that medical doctors and professional nurses performed various roles such as patient care, teaching, research, and administration. However, blood tests and X-rays, performing Caesarean Sections and prescribing treatment for patients were primarily done by medical doctors.

5.3.3 What tasks do medical doctors and professional nurses perform in the five selected district hospitals of OR Tambo Health District?

The purpose of this question was to get an understanding of what medical doctors and professional nurses working in the five selected district hospitals need information for. In-depth interviews, observations, and survey were done to address this question.

According to the nursing service managers and clinical managers, medical doctors and professional nurses need information in order to support patient care. All the nursing service managers interviewed acknowledged that professional nurses need a wide variety of information related to patient care including passing their knowledge on to patients and their families. The following are some of the verbatim responses:

Nursing service managers A: "*Professional nurses need information to improve patient care. They need to grow in the profession. When they come here, fresh from university, they come with limited information. There is a need to equip them with knowledge to*

close the gap of the limited skills they possess. Access to information will close the gap between practice and theory in their work."

Nursing service manager C: *"Nurses are here to take care of patients, so their information needs centre on patients. To be the best in what they do, they need to consult. They must read so they are aware of what is happening in the medical profession out there. Even myself, I am still learning, I go for in-service training. We need to read those big books; there are a lot of changes that are happening."*

Nursing service manager D: *"Information is needed for diagnosis of patients. It leads to proper diagnosis because you cannot diagnose properly if the information is inadequate."*

Nursing service manager D: *"The nurses come with very limited knowledge when they start working; therefore, they need to be equipped with proper knowledge that nurses are supposed to have."*

According to clinical managers, medical doctors have a greater diversity of information needs than nurses. Despite this diversity, one information need mentioned by all Clinical Managers was the need for information for management of common medical conditions. One Clinical Manager noted that the information needs of doctors involved two aspects, namely access to up-to-date information for patient care and information that is specific to the needs of rural hospitals in the broad context of South Africa as a developing country.

Clinical manager A had this to say: "*South Africa faces unique challenges that developed countries do not face, such as a high rate of communicable diseases such as TB and HIV/Aids. In particular, rural hospitals in South Africa must contend with challenges that urban hospitals need not do, such as cholera. It is important therefore that information is not only up to date, but also relevant to the needs of the targeted users; it must talk to the problems of the region."*

Moreover**,** clinical manager A added, *"I am a big believer that rural hospitals should not mean second-best or left behind. We should be treating patients according to the latest thinking on any topic. Relevant information that can apply not only in the context of South Africa but to the context of rural South Africa is vital."*

Clinical manager B argued that medical doctors have an overall responsibility for the care of their patients. They are expected to be flexible, possess expertise, and know about the common medical conditions presenting to their district hospitals and therefore need to be equipped in all areas of medicine. Clinical manager B added, *"The information needs may vary, depending on the type of hospital. This is a level 1 hospital; doctors are everything here, and access to medical information that is current is needed by doctors - current and evidence-based information. Currently, cases that are beyond the scope of this hospital have to be referred to other hospitals, due to lack of knowledge, among other things."*

Medical doctors and professional nurses are expected to know and implement relevant legislation, hospital policies and procedures, and regulations by health professional regulatory bodies. In this regard, Clinical Manager B asserted:

"They also need information that speaks to policies and procedures. Apart from medical information, there is a need for information related to the legal and ethical framework within which they practice. Such information is not readily available to practitioners in rural settings. Medical doctors need to understand the ethical implications for patient care so that they can eliminate risky actions."

Besides, it was reported that exposure to patient care information is what is important for medical doctors. However, there is also a need for information relating to the wide diversity of other tasks they execute as part of their responsibilities. In the words of clinical manager C*: "Diagnosis, medication, bed capacity, administration, the day-to-day running of a hospital and patient security which are priorities, were other tasks of*

medical doctors and professional nurses. They have to be on top of things when it comes to caring for patients."

Clinical managers underscored the need for information by medical doctors to support clinical care. It was argued that medical doctors seek information to keep up with clinical evidence in order to ensure that they provide the best possible medical care for their patients. In this context Clinical Manager D noted that, *"Medical information evolves; there is too much information being published. Doctors need to ensure they are up to date with it, and then they can treat patients using the most recent evidence*."

This claim was supported by the results from the survey, which showed that the majority of respondents *always* 132 (84.0%) *or often* 18 (11.5%) sought information for patient care.

It was also revealed by clinical managers that medical doctors needed information for research, teaching, training, and self-development. Clinical manager D therefore observed: "*The University sends its medical students here for training, so doctors do research in order to teach the students, and they must research for their own development too*." According to the results of the survey, most respondents reported that they *always* 65 (47.4%)/ "*often*" 36 (26.3%) looked for information for research purposes. The majority of the respondents *always* 80 (54.1%)/ *often* 39 (26.4%) sought information for teaching purposes whereas 39 (19.6%) *seldom* used the information for teaching purposes.

Clinical manager E noted that another factor contributing to the diversity of information needs of a medical doctor was the medical domain in which the medical doctor worked. In this regard he asserted:

"As a doctor I think information needs cut across all the different domains. Doctors here are all medical officers; they work as generalists. We don't have specialists. However, I also believe that the needs will vary depending on the domain in which each doctor is working."

In addition, the results from observation showed that the greatest need for medical doctors and professional nurses was information related to medical conditions encountered in various sections of the hospital; and how to diagnose and treat patients. This finding was corroborated by the survey that majority of the respondents needed information for patient care. The findings also revealed that respondents needed information for personal needs, general awareness, and continuous professional development.

Most of the respondents reported seeking information for personal use**.** The analysis of the data showed that the other respondents *always* 72 (50.7%)/ *often* 37 (26.1%) sought information for personal needs. Respondents further reported that they *always* 90 *(*63.4%)/ *often* 31 (21.8%) sought information for continuous professional development (CPD) purposes. Amongst the survey respondents, it was found that a significant proportion indicated that they *always* 82 (56.6%) or *often* 48 (33.1%) need information for general awareness. Table 13 below shows distribution of respondents according to their information needs.

Table 13: Information needs of medical doctors and professional nurses (Source: Field data)

Information need	Always	%	Often	%	Seldom	%
Patient care (n=157)	132	84.0	18	11.5	7	4.5
Personal use (n=142)	72	50.7	37	26.1	33	23.2
Continuous Professional Development (n=142)	90	63.4	31	21.8	21	14.8
General awareness (n=145)	82	56.6	48	33.1	15	10.3
Research (n=137)	65	47.4	36	26.3	36	26.3
Teaching (n=148)	80	54.0	39	26.4	29	19.6

In summary, the findings overall revealed that the respondents needed information for provision of quality patient care (management of common medical conditions, diagnosis, medication, bed capacity, day-to-day running of the hospital, applicable legislation, regulations and procedures), teaching and training, research and continuing professional development. This study has shown that medical doctors and professional nurses in the five selected district hospitals look for information to support their professional role and associated tasks particularly patient care as well as for general awareness and personal use.

5.3.4 What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals?

The purpose of this question was to get an understanding of the information sources that are preferred by medical doctors and professional nurses working in the five selected district hospitals. From in-depth interviews, observations and survey the preferred information sources included clinical guidelines, reference books, hospital procedure manuals and drug lists as sources of information.

According to the clinical managers and nursing service managers, it was easier to consult clinical guidelines. They were available in the wards, outpatients, and casualty for use whenever needed. In some instances, they have been printed and compiled into a portable booklet or distributed electronically to medical doctors for ease of reference.

In the words of nursing service manager A: "*Every ward is expected to have clinical protocols according to the health standards.*"

Clinical manager D weighed in saying: "*In our hospital, we make sure that all doctors have copies of guidelines for common medical conditions in the form of a booklet.*"
The observation made by the researcher revealed that:
"*PNs used protocols and guidelines all the time. Medical doctors on the other hand rarely consulted written guidelines. It was only in two hospital wards; Out Patient*

Department (OPD) and Casualty where medical doctors were observed scanning guidelines."

Use of clinical guidelines was also revealed by the survey. The majority of the respondents reported that they *always* 118 (77.6%)/ *often* 27 (17.8%) used protocols or guidelines kept in the ward as a source of information.

The results revealed that medical doctors and professional nurses were using reference books, hospital procedure manuals, library books and drug lists as a source of information. Clinical manager D noted that:

"*Each ward in a hospital had a copy of the drug list and medical doctors especially those who were new learned from these drug lists.*"

The nursing service manager A added that: *"I buy the books from DENOSA, then I will tell them to come to my office to get the books. There is no library and the administration is the only office with internet. Nurses use their phones to Google the information but that consumes their bundles."*

Furthermore, the findings from the survey revealed that respondents used reference books kept in their hospitals. Table 14 below gives the analysis of the data showing that the majority of survey respondents *always* 64 (46.7%)/ *often* 30 (21.9) used reference books at hospitals as a source of information.

Table 14: Distribution of respondents according channels and sources of information preferred

statement	Always	%	Often	%	Seldom	%
I talk to colleagues as a source of information (n=158)	113	71.5	32	20.3	13	8.2
I consult doctors as a source of information (n=158)	103	65.2	44	27.8	11	7.0
I consult senior nurses as a source of information (n=155)	101	65.2	42	27.1	12	7.7

statement	Always	%	Often	%	Seldom	%
I talk to people outside of your work as a source of information (n=131)	63	48.1	33	25.2	35	26.7
I read newspapers as a source of information (n=138)	50	36.2	35	25.4	53	38.4
I use my mobile phone to access internet as a source of information (n=140)	83	59.3	33	23.6	24	17.1
I use computer at work to access internet as a source of information (n=114)	41	36.0	16	14.0	57	50.0
I use reference books kept in the hospital as a source of information (n=137)	64	46.7	30	21.9	43	31.4
I use protocols/guidelines kept in the ward or my pocket book as a source of information (n=152)	118	77.6	27	17.8	7	4.6
I consult the hospital policy manual as a source of information (n=147)	101	68.7	29	19.7	17	11.6
I use library books as a source of information (n=116)	39	33.6	26	22.4	51	43.9
I attend seminars run in the hospital as a source of information (n=114)	40	35.0	31	37.2	43	37.7
I attend training workshops organized by non-governmental organisations as a source of information (n=123)	36	29.3	41	33.3	46	37.4
I attend training workshops organized by provincial office as a source of information (n=131)	45	34.4	41	31.3	45	34.4
I attend training workshops organized by district office as a source of information (n=136)	43	31.6	49	36.0	44	32.4
I use Mind-set facilities available in the hospital as a source of information (n=110	38	34.5	31	28.2	41	37.3

Furthermore, the analysis of data showed that most 51 (44%) of those who worked for the targeted hospitals *seldom* used library books as a source of information. The second in that order of respondents was 39 (33.6%) who *always* used library books for consultations. The smallest among response group was 26 (22.4%) which *often* used library books.

There was a general agreement amongst survey respondents that the hospital policy manuals were reliable sources of information. As demonstrated by the survey, the majority of the respondents *always* 101 (68.7%) and often 29 *(*19.7%*)* consulted hospital procedure manuals as a source of information.

Some respondents believed that seminars run by hospital management were sources of information for respondents. This was supported by 40 (35.1%) who *always* and 31 (27.2%) who *often* used seminars as a source of information. However, the results showed that a significant proportion of the respondents 29 (37.7%) *seldom* used seminars in the hospital as sources of information. The findings of the survey showed that a significant proportion of the respondents 51 (44%) *seldom* used library books as a source of information, even though 39 (33.6%) *always* or 26 (22.4%) *often* used library books for consultations.

According to the nursing service managers and clinical managers, medical doctors and professional nurses relied a great deal on their colleagues for information. Nursing service manager B in this regard noted: "*Doctors and nurses work together as a team. " Nurses generally ask other nurses or their doctor when they need information about the patient*."

Similarly, clinical manager C pointed out that:

"*Doctors request assistance or more information from another senior doctor and get in contact with the specialist if they cannot find a solution to the patient problem."*

It was further observed by the researcher that:

"*Senior doctors passed information to junior doctors through their morning meetings. In addition, junior professional nurses tended to rely on senior professional and medical doctors as a source of information*."

In addition, the researcher observed that: "*medical doctors and professional nurses relied on their colleagues for information. This worked mostly as a one-way process, from older doctors to younger and is based on their years of experience.*"

It was observed further that "*When specialised information was required, all medical doctors, young and old, had to phone medical specialists at the referral tertiary hospitals.*"

Clinical manager B noted that: *"For example, on Wednesdays we have theatre day where young and old doctors gather together. The intention is to pass knowledge onto the younger doctors, like those doing community service, because they might not know certain procedures. If the students are available we also teach them."*

The findings from the survey showed that the majority of the respondents *always* 113 (71.5%) and *often* 32 (20.3%) talked to their colleagues as a source of information. Furthermore, some of the survey respondents reported to *always* 63 (48.1%) and *often* 33 (25.2%) talk to colleagues outside of work environment as a source of information.

According to the clinical managers and nursing service managers, in-service training, workshops and seminars were important sources of information. Such in-service training was provided to bridge the gap between theory and practice, refresh, or provide updates. Senior nurses do in-service training for new nurses to improve quality of patient care and upgrade their practical skills, while medical doctors conduct in-service trainings for all professional nurses on issues where nurses' knowledge is felt to be lacking.

Nursing service manager B pointed out that:

"These in-service trainings are strengthening the skills and reminding PNs of what was taught at school. They are a way to bridge the gap between theory and practice."

Nursing service manager D on his part noted*: "PNs in this hospital only use information that has been gathered from somewhere like a workshop, and that is the only thing. No library, no computers, and no internet. Having a library here would go a long way in providing information services needed for decision making, but as things stand this is not happening."*

The researcher observed that, amongst clinical mangers, workshops were seen as a way to communicate medical doctor's responsibilities to them rather than specifically a way to look for information. For professional nurses, workshops played a much broader role; they were a means to get information and skills in order to function properly in their jobs.

In addition, respondents in the survey agreed that they *always* 36 (29.3%)/ *often* 41 (33.3%) attended training workshops organised by non-governmental organisations as a way of being informed about developments in their area or field of practice. Furthermore, some survey respondents *"Always*" 45(34.4%)/ *"Often*" 41(31.3%) attended training workshops organised by the provincial office. In addition, the survey showed that some of the survey respondents *always* 43(31.6%) and *often* 49*(*36%) attended training workshops organised by the district compared.

According to nursing service manager E: "*Ward rounds are very important….they take place every morning, when medical doctors assess and plan for each patient, in consultation with senior professional nurses.*"

Clinical manager C also added that, "*For new medical doctors, ward rounds are an essential aid to learning, a daily opportunity to gain vital information and medical knowledge from more experienced doctors*."
The researcher observed that

"*Ward rounds were undertaken every morning ….when medical doctors and nurses assessed and planned for each patient in the ward*."

Similarly, according to clinical manager A, "*Ward rounds are critical activities that bring together a multidisciplinary team of medical professionals to review and plan a patient's care. Ward rounds are also an opportunity for joint learning for health professionals as they share experiences regarding the condition of a patient*."

In the absence of reliable internet connectivity in the hospitals, the results revealed that professional nurses and medical doctors often relied on their own personal cell phones to access information on the internet. Clinical manager D noted:
"Through our phones we are able to access Medscape and up-to-date databases."

The majority of the survey respondents indicated that they *always* 83 (59.3%) and *often* 33 (23.6%) used mobile phones to access internet for obtaining information. The use of mobile phones as means to access the internet was observed to be common to both nurses and doctors though the high cost remains a concern as attested to by clinical manager E who noted:

"The better option currently is mobile phones, though there is an issue with data. I understand data is expensive."

In summary, a medical doctor and professional nurse in the five selected district hospitals preferred to use clinical guidelines, colleagues, hospital policy/procedure manuals, personal mobile phones, in-service training, workshops and seminars, reference books, library books, medical specialists and ward rounds as sources of information. Interpersonal information sources such as colleagues, medical specialists, ward rounds and hospital ward-based print sources such as reference books, clinical guidelines, policy and procedure manuals and drug lists were the other preferred sources of information in the selected district hospitals.

5.3.5 What factors facilitate or hinder the information seeking by medical doctors and professional nurses in the five selected hospitals?

This question sought to establish factors that facilitate or hinder access to information (see question 7 of **the interview schedule**, appendix 1) was asked during the interview with clinical managers and nursing service managers. In addition, direct observation of both medical doctors and professional nurses by the researcher took place. The survey respondents were on their part asked to rate the importance of these factors that included accessibility of the information source, cost of the information source, familiarity/ awareness of the information source and trustworthiness of the information source in facilitating information seeking.

5.3.5.1 Factors facilitating information seeking by medical doctors and professional nurses

The findings revealed the following factors as facilitating information seeking behaviour by medical doctors and professional nurses: personal attributes (willingness to learn, exposure to information during undergraduate training, peer pressure and being of younger age), accessibility of the information source; format of the information source; familiarity of the information source; and trustworthiness of the information source.

According to the nursing service managers and clinical managers, willingness to learn, exposure to information during undergraduate training, peer pressure and being of younger age were important factors motivating medical doctors and professional nurses to look for information. In addition, the critical factor contributing to the successful gathering of information was the individual doctor or professional nurse. Their willingness to learn, their motivation to make the most of what is available, and the energy with which they approached the task of finding out what they needed to know contributed to information gathering.

Clinical manager B reported:

"I think everything falls on the willingness of the individual doctor. They don't have access to space in terms of offices and they don't have access to technology, there is no

internet. The best available thing is the phone. Infrastructural issues … in the design of the hospital somebody should have thought of designing the library.”

On her part, clinical manager A noted:
“*Individual motivation keeps medical doctors learning even under difficult conditions, where there is no internet, no library, and no specialist on site.”*

Clinical manager B was also of the view that, *“doctors are keen to learn. Their willingness makes it easy to access information. It is about individual growth; they have to have a passion for learning.”*

According to clinical manager A,
“Peer pressure pushes them to want to learn. We attend conferences, paying from our pockets, to keep up to date. It is about taking pride in what you do. One needs to take charge of her own development.”

Nursing service manager E was of the view that:

“*Some are lazy. They are happy with what is available to them and do not bother to go the extra mile. However, some demonstrate an extremely positive attitude, and come to me seeking to know where they can get information on certain cases.*”

Nursing service manager C was of the view that, “*If, during training, there was no appreciation for the vital role that relevant information plays, that particular PN will not care much about the availability or non-availability of information. Those who were involved in research during training demonstrate a far more positive attitude towards information.*”

Nursing service manager D added:
“Attitudes are good really, you can see from the questions they ask. They come to me from time to time, especially the young generation, they are eager … except those you can see that are already tired.”

Similarly the survey respondents identified the following as important factors facilitating information seeking: accessibility of the information source 159 (97%); format of the information source 123 (78.9%); cost of the information source 123 (81.4%); familiarity of the information source 134 (89.3%); and trustworthiness of the information source 150 (94.3%). Table 15 below shows proportion of survey respondents rating the importance of the factors facilitating information seeking by medical doctors and professional nurses.

Table 15: Factors facilitating information seeking of medical doctors and professional nurses (Source: Field data)

	Very important	%	Important	%	Somewhat important	%
Accessibility of the information source (n=164)	109	66.5	50	30.5	5	3.0
Format of the information source (n=156)	70	44.9	53	34.0	33	21.2
Cost of the information source (n=151)	76	50.3	47	31.1	28	18.5
Familiarity/ awareness of the information source (n=150)	89	59.3	45	30.0	16	10.7
Trustworthiness of the information source (n=159)	115	72.3	35	22.0	9	5.7

5.3.5.2 Factors hindering information seeking by medical doctors and professional nurses

The respondents were similarly asked to state factors that hinder information seeking. According to the nursing service managers and clinical managers important factors that hinder access to information include: lack of time, lack of computers, lack of technological skill, slow internet or poor connectivity, lack of physical libraries,

irrelevant print material, not knowing how to formulate search questions and lack of awareness about information sources. Nursing service manager A succinctly summarised the challenges that were hindering information seeking stating:

"*Nurses want to be good at what they are doing; they are here because they want to be here. Their attitudes are good because they want to learn, the problem is only resources. Our job is not made easy at all; I hope after all this, something is going to be done. People from the department have been here many times but still nothing."*

Nursing service manager E on his part pointed out that: "*The attitudes of nurses are positive. They are eager to learn and as such get very frustrated at the lack of information sources around.*"

According to the clinical managers and nursing service managers, medical doctors and professional nurses do not have enough time to access information. The nature of their work requires them to spend most of their time with patients. They work long hours and the situation is even worse for those working in understaffed units. They noted that lack of time was a major barrier to access information. Nursing service manager D in this regard noted:

"*For PNs the big constraint to look for information was time. Shifts are long, hospital libraries are not always conveniently close to wards, and PNs did not always make the time to appraise themselves of every source of information available*."

Nursing service managers and clinical managers reported that medical doctors and professional nurses had no access to computers when they were at work. This was expressed clearly:

Similarly nursing service manager E asserted, *"Nurses do not have computers, we do things manually, even the minutes of the meetings are done manually. Only the administration people have a computer."*

The lack of computers and the internet made it difficult for the professional nurses to acquire some level of competence and the necessary computer literacy skills. Nursing service manager E on the issue of competency noted, *"Nurses are also technologically illiterate as a result of their lack of exposure to computers. It would be nice that when we have our own library, they are also taught how to use computers."*

The researcher observed that there were no computers in the wards and computers were only available in offices of the managers. According to the analysis of data 57 (50%) of those who participated in this study *seldom* used computers to access internet or as a source of information. It was observed here that the use of computers was a little bit unpopular as compared to the use of mobile phones.

Clinical managers and nursing service managers reported that the lack of libraries was a stumbling block to information access and where available it was either dedicated to a particular group such as nursing students or far away from the workstations.

Nursing service manager A lamented that the only library that professional nurses could access belonged to nursing students and was outside the hospital. She also asserted:

"We do not have our own library, the library you see is for nursing student and when the college is closed, that means we also do not have access to it. Another problem is that it is far from us and that makes it difficult to access it. It would be nice to have our own library."

As a result, medical doctors and professional nurses did not use them nor had knowledge if their colleagues used them. Nursing service manager C noted that:

"I do hear there is a library, but is outside the hospital. I cannot say the PNs use it; I have never been there myself."

Clinical manager A was of the view that, "*A small library is available but books are not up to date. Yes, there is one - an impressive reference section that one can refer to.*"

The researcher observed that the mini-library had irrelevant material or outdated books which could not be used by medical doctors and professional nurses in their information seeking activities. This is further reported by survey respondents when they indicated that a significant proportion of them did not consult print material from the library. They also reported a majority of them relied on their personal book collection. The responses showed that in the midst of resource shortages some medical doctors and professional nurses relied on their personal book collection. The survey revealed that respondents *strongly agreed* 72 (46.8%) or *agreed* 50 (32.5%) with the statement.

According to the clinical managers and nursing service managers, medical doctors and professional nurses do not have access to internet. In the event that they need internet, they have to go to the nursing service manager's office or CEO's office where there is internet. This is however slow or not always available.
Nursing service manager B had this to say:

"Here the 3G card is centralised in the CEO's office; whoever wants to access internet must go to the hospital CEO. Most of the time the CEO is not available and everyone is relying on that 3G card to access the internet. It would be nice to have a library where nurses would get assistance, even teaching them how to use computers, because PNs here are also technology illiterate."
Clinical manager A asserted:
"Equipment and computers for telemedicine are available but not connected. It would make it easy for us to access information by communicating with colleagues in other hospitals. The only source of information that is functional here is the library, which was started for students who came for training. Most doctors are not used to going to the library. They prefer electronic media. Another problem is that when using our phones, we incur data costs."

The clinical managers highlight that the current alternative is the use of personal mobile phones which is expensive and remain optimistic about a new development in the form of

the health resource centre. Clinical manager D therefore had this to say, *"The better option currently is mobile phones, though there is an issue with data. I understand data is expensive, but not that expensive, if you think about all the information you get."*
Similarly, clinical manager C noted, *"It is hoped that the resource centre that is being constructed will go a long way in assisting doctors with these challenges by providing Wi-Fi, internet and journals."*

Table 16 presents factors hindering information seeking by medical doctors and professional nurses.

Table 16: Factors hindering information seeking by medical doctors and professional nurses (Source: Field data)

	Very Important	%	Important	%	Somewhat Important	%
Lack of Physical library (n=153)	100	65.4	16	10.5	37	24.2
Lack of Print material (n=151)	100	66.2	27	17.9	24	15.9
Print material not being relevant (n=134)	74	56.1	24	18.2	34	25.8
Not knowing how to formulate search questions (n=136)	64	47.1	35	25.7	37	27.2
Lack of awareness about information sources (n=138)	74	53.6	43	31.2	21	15.2
Lack of time (n=154)	66	39.5	72	43.1	16	10.4
Lack of online access (n=151)	89	58.9	33	21.9	29	19.2
Lack of skill to search online resources (n=148)	76	51.4	45	30.4	27	18.2
Slow internet (n=146)	79	54.1	32	21.9	35	24.0

5.4 Summary

The findings of this study are summarised below under the relevant research questions:

***What roles, and tasks do medical doctors and professional nurses play in the five selected district hospitals of OR Tambo Health District*?**

The findings generally revealed that professional nurses and medical doctors were involved in patient care-related roles as well as teaching, training and research. The study also revealed that medical doctors and professional nurses performed specific patient care related tasks such as attending to patients in outpatients, casualty and the inpatient wards; conduct diagnostic investigations; diagnose and treat patients; perform surgical procedures; educate patients and teach health workers and health sciences students. They also performed tasks associated with their teaching and research roles.

***What are the information needs of medical doctors and professional nurses in the five selected district hospitals*?**

The findings generally revealed that medical doctors and professional nurses needed information for provision of quality patient care (management of common medical conditions, diagnosis, medication, management of bed capacity, day-to-day running of the hospital, complying with applicable legislation, regulations, and procedures), teaching and training, research, continuing professional development, general awareness, and personal use.

***What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals*?**

The findings revealed that medical doctors and professional nurses in the selected hospitals preferred to use clinical guidelines, colleagues, hospital policy/procedure manuals, personal mobile phones, in-service training, workshops and seminars, reference books, library books, medical specialists and ward rounds as sources of information.

***What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals*?**

The findings showed that personal attributes (such as willingness to learn, exposure to information during undergraduate training, peer pressure and being of younger age), accessibility of the information source; format of the information source; familiarity of the information source; and trustworthiness of the information source facilitated information seeking of medical doctors and professional nurses.

The findings revealed that factors that hinder access to information included the lack of time, the lack of computers, the lack of technological skills, slow internet/ poor connectivity, the lack of physical libraries, irrelevant print material, inability to formulate search questions, and the lack of awareness about information sources.

The study has established that information needs of medical doctors and professional nurses, information sources, factors facilitating or hindering access, seeking and use of information. It is concluded that the information needs of medical doctors and professional nurses are primarily informed by roles and tasks they perform with regard to patient care, teaching, training, and research. There is preference of interpersonal sources and print over other sources generally due to availability, convenience, trustworthiness, and cost-effectiveness. It is concluded that the use of the internet is yet to be integrated in the performance of medical doctors and professional nurses' roles, and tasks largely due to poor connectivity and unavailability of computers. It is also concluded that due to heavy reliance on print and interpersonal sources of information, personal attributes and characteristics of the information source were important considerations in the information seeking behaviour of medical doctors and professional nurses. Because of the barriers to accessing and using information by medical doctors and nurses, this affected the quality of information accessed.

CHAPTER SIX

DISCUSSION OF FINDINGS

6.1 Introduction

This chapter presents the discussion of findings based on the data analyses presented in the previous chapter. The discussion of the findings is organised around the research questions and where appropriate interpreted using extant empirical literature and theory that underpinned the study. The discussion of findings covers the roles and tasks of professional nurses and medical doctors, information needs of professional nurses and medical doctors, sources of information used by medical doctors and professional nurses, and factors that facilitate and hinder information seeking by medical doctors and nurses.

The study sought to address the following research questions:

1. What roles do medical doctors and professional nurses perform in the five selected district hospitals of OR Tambo Health District?
2. What tasks do medical doctors and professional nurses perform in the five selected district hospitals of OR Tambo Health District?
3. What are the information needs of medical doctors and professional nurses in the five selected district hospitals?
4. What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals?
5. What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals?

6.2 What roles do medical doctors and professional nurses perform in the five selected district hospitals of OR Tambo Health District?

According to Leckie *et al*. (1996), model of information behaviour, all professionals assume a number of complex work roles, which have tasks attached to them. Leckie *et al.* (1996) postulate that the tasks associated with each professional role are more likely to

prompt specific information needs. These tasks inform and give shape to the nature of the information needs of professionals. In order to understand the information behaviour of medical doctors and professional nurses, Leckie *et al*. (1996) argued that it is only through their work roles and associated tasks that an understanding of why, how and when they seek information can be appreciated.

The findings as presented in the preceding chapter revealed that medical doctors and professional nurses performed variety of roles in the hospital that were, patient care-related. These roles included but were not limited to inpatient care wards in (surgical wards, maternity wards, medical wards, and paediatric wards), outpatient care units (OPD, and casualty departments) and hospital theatres. The findings of the study revealed that outpatients departments provided care for the non-emergency patients referred from the clinics and community health centres, whilst the casualty department received trauma and non-trauma emergency patients on a 24-hour basis. Furthermore, hospital theatres provided elective and emergency surgical operations including Caesarean sections, whilst the inpatient care wards provided care for admitted patients on a 24-hour basis.

The findings revealed that inpatient care was quite diverse. For example, medical wards provided care for chronic non-communicable diseases, HIV and AIDS, mental health conditions; while surgical wards cared for common surgical conditions, trauma, gynaecology, urology, and orthopaedics. Maternity provided care for pregnant mothers including the unborn baby from conception to birth. Surgical wards and maternity admitted, prepared and cared for patients requiring theatre operations. The medical doctors were assigned a roster covering delegated roles for a defined period. For example, a doctor could be allocated to conduct an inpatient ward round (assess progress of admitted patients), an outpatient clinic (see patients presenting from home, clinic or community health centre) and perform after-hour duties (cover emergencies for the hospital) in a 24-hour period. Professional nurses on the other hand were assigned roles based on their delegations to a specific ward such as labour ward or casualty during the day or after hours. Both medical doctors and professional nurses performed

professionally regulated roles in line with stipulation of the Health Professions Council of South Africa (HPCSA) and South African Nursing Council (SANC) respectively.

In addition to the patient care role, the findings revealed that medical doctors and professional nurses performed teaching, training, and research roles. These roles were consistent with academic responsibilities played by the district hospitals in OR Tambo Health District. The five selected district hospitals are accredited by the HPCSA to provide teaching of either medical students or clinical associate students from Walter Sisulu University. This role requires medical doctors, who are in joint appointment between the university and the Eastern Cape Department of Health, to serve as clinical preceptors or participate in teaching activities. The five selected hospitals in the OR Tambo Health District are also accredited for the teaching of nursing students from Lilitha Nursing College. Besides serving as clinical preceptors or participating in teaching of nursing students, professional nurses are expected to ensure continuing professional development of their respective care teams.

6.3 What tasks do medical doctors and professional nurses perform in the five selected district hospitals of OR Tambo Health District?

The Leckie *et al*. (1996) model of information behaviour underscores the importance of understanding specific tasks associated with the role of medical doctors and professional nurses in patient care, teaching, training and research so as to gain a better appreciation of their information needs. These tasks also serve as a framework through which the information needs of medical doctors and professional nurses are determined (Elsweiler, *et al*., 2011). Wilson (1981) similarly asserts that, the tasks performed by medical doctors and professional nurses are more likely to motivate them to look for information. Therefore understanding the specific tasks associated with the professional role of medical doctors and professional nurses, is key to understanding how, why and when they look for information (Bystrom, 1999; Bystrom & Jarvelin 1995; Murtonen, 1994).

The study sought to respond to a sub-question: *What specific tasks do medical doctors and professional nurses perform in the five selected district hospitals*? The findings revealed that medical doctors and professional nurses performed specific tasks that emanate from their roles in patient care, teaching, training, research, attending to patients in outpatients, casualty and the wards; conducting diagnostic investigations; diagnosing and treating patients; performing surgical procedures; educating patients and teaching health workers and health sciences students. These roles were consistent with the dual mandate of the hospitals as service delivery (through the NDoH District Hospital Service Package or Gazette on Management of Hospitals) and academic/ teaching facilities (through the accreditation by HPCSA or SANC).

6.4 What are the information needs of medical doctors and professional nurses in the five selected district hospitals?

The findings in this study showed that the professional roles of medical doctors and professional nurses in the five selected district hospitals included provision of patient care, teaching, training and research. The associated tasks of these roles of medical doctors and professional nurses include taking history, examining, and investigating, diagnosing, treating, and educating patients. The findings further revealed that, medical doctors and professional nurses needed information for provision of quality patient care including but not limited to management of common medical conditions, diagnosis, medication, bed capacity space, day-to-day running of the hospital, observing applicable legislation, regulations and procedures), teaching, training, research and continuing professional development.

Leckie *et al*. (1996) model of information behaviour postulates that the role played by the medical doctors and professional nurses in the hospitals provides the basis for determination of their information needs. They argue that the information needs are informed by their work roles and shaped up by the tasks associated with the said work role. Similarly, Wilson (1981) points out that, the task to be performed motivates [in this

case] the medical doctor or professional nurse to look for information necessary to perform that specific task.

The findings showed that medical doctors and professional nurses in the five selected district hospitals needed information in order to support their professional roles and associated tasks particularly patient care. This is because the primary and core business of the hospitals is patient care. These findings are consistent with available evidence in international literature such as (Alaghanim, 2011; Bennett *et al*., 2004; Bryant, 2004; Cheng, 2004; Davies, 2007; Dorsch 2000; Flynn & McGuinness, 2011; Jones, Schilling & Pesut, 2011; Lappa, 2005; Ogbomo 2012; Turner *et al*., 2008;Weightman & Williamson, 2005; Younger, 2010). These studies have concluded that medical doctors and professional nurses primarily need information in order to provide quality patient care. The findings in this study are corroborated by Turner *et al.* (2008), who reported that the positions and roles of nurses determined their information needs. For example, in a study on the information needs and information-seeking behaviour of doctors in the United States of America, Bryant (2004) supported the findings of this study when he reported that doctors were prompted to seek information by a variety of needs arising from their professional responsibilities. Bennett *et al*. (2004) undertook a study to determine the information behaviours and reflective practices of doctors in the United States of America and reported that information was needed in order to deal with specific patient problems and to get the latest research on those specific topics. Similarly, Lappa (2005) in a related study reported that 100% of medical doctors in the United States of America needed information for patient care. Likewise Cheng (2004) studied both doctors and nurses, and reached a similar conclusion that they needed information to help them in providing patient care and management.

Davies (2007) and Younger (2010) in a literature review on doctors and nurses' information needs in the UK and the Netherlands; Dorsch (2000) in an analysis of existing literature on information needs of rural health professionals, and Reddy and Spence (2008) in an observation of the information needs of a multidisciplinary patient

care team, have all reported that doctors and nurses need information to support in patient care. Lappa (2005) in a study of the information needs of emergency care physicians found that clinicians' information need was to treat patients, for special quick referral information to treat individual patients, decide on drug dosages, and to help with diagnoses. Alghanim (2011) carried out a study on the information needs and information-seeking behaviour among urban and rural primary care physicians in Saudi Arabia and found no major differences between urban and rural doctors in relation to their information needs. Urban (80.8%) and rural doctors (81.6%) as well as nurses needed information to make decisions about their patients. Dorsch (2000) through review of existing literature to determine information needs of rural health professionals also concluded that health professionals needed information for patient care. These findings emphasise the primacy of the roles of medical doctors and nurses in providing patient care irrespective of the context or setting of delivery. The evidence clearly underscores the importance of patient care information for both medical doctors and professional nurses in performing their roles and associated tasks in the hospital settings (Weightman & Williamson, 2005).

The findings also revealed that besides seeking information to fulfil their core roles and associated tasks; medical doctors and professional nurses needed information for general awareness about trends and debates in the medical field and for personal use. Bryant (2004) categorises the information needs of medical doctors and nurses into general awareness, personal use, information for the clinical care of individual patients (where information is sought to address questions arising from the diagnosis and therapeutic management of particular cases), information to keep up-to-date with developments in the health sector, information to explain to patients various risk factors and information on pharmacological aspects of patient care. Hospitals being an integral part of the national and international health systems, medical doctors and professional nurses are expected to keep themselves abreast of national, regional and global developments. In order to keep abreast of such developments and trends, they must have access to relevant and reliable information. For example, medical doctors and professional nurses need

information about recent development about yellow fever, Ebola virus, and Zika virus in order to be prepared and ready to deal with them in their respective hospitals. They need information that will keep them updated on the development of the national health insurance (for example in South Africa) and the dynamics of universal health coverage at international level. At personal level, medical doctors and professional nurses as members of their families, associations and as leaders need information to perform those societal roles, tasks; and to enrich their personal, organisational, and societal lives. The importance of general awareness and personal aspects of medical doctors and professional nurses cannot be underestimated in their professional and private life. Medical doctors and nurses are expected to become advocates of their patients, populations, and society in general. Jones *et al*. (2011) in a study on reasons for searching the Web by nurses, found that professional reasons were first in a list of nurses' reasons for searching the web, followed by personal reasons, technology reasons and organisational reasons. Pesut (2011) carried out a study on barriers to and benefits associated with nurses' information seeking in the United States of America and reported that nurses needed information for various reasons, including for professional work (information needed for patient/caregiver/family member) and personal reasons. Leckie *et al*. (1996) noted that nurses sought institution-based information and spent a lot of time tracking reports, equipment, locating hospital policies and gathering information related to patient admission, transfer, and discharge. Younger (2010), in a study of internet based information-seeking behaviour amongst doctors and nurses, demonstrated that health professionals' internet use was primarily for the purpose of finding information related to patient management and their own continuous professional development.

Kim (2008) noted that tasks related to medical doctors and professional nurses' work include patient care, educational activities, research activities and recreational activities, and training their professional teams. The medical doctors and professional nurses in the selected hospitals in OR Tambo Health District served as preceptors for the clinical training of medical students and nursing students from Walter Sisulu University and Lilitha Nursing College respectively. Besides, the medical doctors and professional

nurses were required to maintain a portfolio of their continuing professional development by the Health Professionals Council of South Africa. This professional body expects health professionals to continue reading, learning and improving what was taught at school, and keep themselves up-to-date in their respective areas of practice. This is particularly important with increasing generation of information and evolution of new information and communication technologies, new diseases and the changing burden of disease such as TB and HIV & AIDS, non-communicable diseases and maternal and child mortality.

Maggio *et al*. (2014) found that among the key information needed by medical doctors and nurses included training, knowledge production through research and personal learning (continuing professional development), confirming diagnoses, logistics, and teaching. Bryant (2004) also found that information needed by medical doctors included information for the clinical care of individual patients, information to keep up-to-date with developments in the health sector, information to explain various risk factors to the patients and to be informed about pharmacological issues.

Wyatt and Sullivan (2005) reported that the amount of medical information doubles every 20 years, whilst Naidoo et al. (2010) added that medical knowledge increases fourfold during the professional lifetime of health professionals. This situation is exacerbated by the fact that medical doctors generally encounter about 400 diseases on a daily basis and rarely have direct producible knowledge at the time of treatment for rare diseases and special problems (Meijiman, 2006). Thompson (1997) similarly argues that the knowledge doctors have accumulated over the years, which constitutes their knowledge base, is not enough to deal with all the medical problems they are confronted with in the course of their professional lives. Moreover, information needs of medical doctors and professional nurses involve access and use of medical technologies for medical procedures, which demand additional competencies on how to handle such technologies and procedures (Andualem et al., 2013). Andualem and colleagues noted that access to information helps to build one's knowledge base, necessary when practicing evidence-

based medicine. The rapid increase in information implies that medical doctors and professional nurses must constantly update their knowledge in order to keep up-to-date with new developments in their field by attending continuing professional development courses.

Finally it can be surmised that medical doctors and professional nurses need information for patient care, teaching and training, research, general awareness, personal reasons and continuing professional development. The information need is informed by professional roles of medical doctors and professional nurses and their associated tasks.

6.5 What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals?

Leckie *et al*. (1996) model of information behaviour assert that, all professionals assume a number of complex and various work roles with specific tasks attached to each role. The tasks prompt a specific information need thereby leading to a start of an information seeking process. This process includes interaction between the information seeker and information sources. Once the information-seeking process starts, intervening variables such as information source characteristics (for instance quality, cost, accessibility, format, and awareness of information) will determine the success or failure of the information-seeking process (Leckie *et al*., 1996). Spink and Cole (2001) reported that information seeking is not a straight-forward activity and requires access to various sources of information in order to get relevant information required to deal with specific information needs. Leckie *et al*. (1996) identified cost of the information source, trustworthiness of the information source, familiarity with information source, accessibility of the information source and format of the information source as determinants for the use of the information source. Wilson (2000) suggests three characteristics of information sources that impact on how information sources can be used; namely access, credibility, and channel of communication. It is important that sources of information are easy to access as the lack of access may impede information-seeking or impose high costs which

the searcher might not be able to pay (Wilson, 2000). An information user may doubt the credibility of an information source if the information searcher is doubtful of the quality and accuracy of the information obtained from the source (Wilson, 2000). The channels that can be utilised for information access range from electronic, print, and interpersonal contacts. Wilson (2000) argues that the channel through which information is received plays an important role in the subsequent use of information source. Macgettigan *et al* (2001) argue that the medium through which information is available seems to be more important to doctors than the message itself. As a result, personal contacts tend to be rated as the most reliable information source by doctors. Gorman, Ash, and Wyckoff (1994) suggest that doctors tend to choose information sources that are easily available, cost-effective and do not take a lot of their time and effort. It is therefore important to ascertain the preferred sources of information by medical doctors and professional nurses working in the selected district hospitals to improve the provision of information sources relevant to their information needs. Leckie *et al.* (1996) further identify the "outcome" as the necessary last part of the information-seeking process. Outcome could lead to information being put into use if it is relevant to the need or the information seeking process or repeated if the need has not been met. In order to meet their information needs, namely patient care, teaching and training, research, general awareness, personal reasons and continuing professional development, the study therefore sought to respond to the research question: What are the channels and sources of information preferred by the medical doctors and professional nurses working in the five selected district hospitals? The findings to this question have shown that medical doctors and professional nurses working in the five selected district hospitals prefer to use clinical guidelines, colleagues, hospital policy/procedure manuals, personal mobile phones, in-service training, workshops and seminars, reference books, library books, medical specialists and ward rounds as sources of information.

The choice of colleagues as a source of information by the respondents is not surprising because the provision of patient care is team-based and the first point of call for

information to help a patient is usually the member of the team. It is conventional practice in health professions for junior staff to ask their senior colleagues for advice or

guidance. The choice of colleagues as the most used information source amongst clinicians was associated with the availability, familiarity, and reliability of such source. Besides, generally no costs are involved when getting answers from colleagues (Dee & Blazek, 1993; Kosteniuk, 2013; Norbert & Lwoga, 2012; Tumwikirize *et al.*, 2008). In addition, colleagues are not only consulted due to their accessibility, acceptability, and convenience but also because of collegiality as well. This is also informed by personal and professional relationships of trust established within care teams, institutional teams and at systems level that have endured over years. During the patient care, the health care teams are structured with clear lines of communication reporting with an identified nurse-in-charge and doctor-in-charge of the care of each patient. This network of team members guides the seeking of information, guidance, as well as consultation within and beyond the care team. Leckie *et al*. (1996) model of information behaviour further argues that the inherent value of using colleagues as a source of information goes deeper than easy access to them. Seeking information from colleagues, give medical professionals the opportunity to socialise as well as to create professional networks.

This finding is supported by international literature that asserts nurses seek information through asking questions from their colleagues (Gonzalez-Gonzalez, Sanchez-Mateos, Riesgo-Fuertes, Escortel Mayor, Sanz-Cuesta & Hernandez-Fernandez, 2007; Davies, 2007). In a study of information behaviour of hospital clinicians, conducted through a survey questionnaire in Ireland, Flynn and McGuinness (2010) found that colleagues were used extensively as information sources. Callen *et al*. (2007) conducted a study of clinical information sources in Mongolia and found that discussions with colleagues were the most frequently used method of getting information. In a study involving 3000 nurses in the United States of America, which assessed readiness of nurses for evidence-based medicine, it was found that 67% of respondents preferred asking colleagues instead of searching formal information sources (Pravikoff et al., 2005). In addition, despite the

availability of online resources, it has emerged that consulting colleagues and using print resources is still the norm for medical doctors and professional nurses
(Younger, 2010). This inclination towards human and print sources is associated with the fact that the time it takes to formulate right search questions and look for information on the internet can be long and some times tedious (Ely *et al*., 2005).

The findings revealed a strong dependence by medical doctors on medical specialists who are contacted by phone, since they work in referral tertiary hospitals. Although specialists were not available in any of the hospitals surveyed, clinical managers mentioned that they were an important resource. All medical doctors relied on some form of access to specialists when faced with difficult medical episodes to resolve. The use of medical specialists as a source of information is normal practice in health care. Though medical specialists were not situated within the same hospitals surveyed, they considered each other as colleagues and part of the health care team within. Medical doctors often contacted medical specialists for a second opinion in investigating and managing complicated patient cases. They also relied on clinical guidelines to reach decisions. It is important that hospitals ensure that clinical guidelines are easily accessible to medical doctors and professional nurses for effective and efficient delivery of heath services.

The findings furthermore revealed that medical doctors and professional nurses consulted clinical guidelines and protocols, hospital policy manuals, reference books and drug lists, in various wards as sources of information. These sources of information are generally found in hospital wards as reference documents. Access to these sources has received close attention from hospital management in the hospitals surveyed following the implementation of health standards in public health facilities. According to the health standards, each hospital ward is required to have verifiable evidence to show that these documents are available and accessible as part of compliance requirement and as sources of information. The compliance is particularly monitored through unannounced visits to the hospitals by officials from the department of health in order to improve the quality of patient care and patient experience.

Xu *et al.* (2005) conducted a study on information needs and information seeking behaviour of nurses in three inpatient acute care settings in the United States of America and found that nurses needed information for protocols and procedures. They also found that respondents were using drug lists as a source of information. During the study of the five hospitals in OR Tambo Health District, clinical managers revealed that drug lists were used as sources of information for medical doctors. Each ward in a hospital had a copy of the drug list and medical doctors especially those who were new, used these drug lists as vital sources of information. In contrast professional nurses seemed not be using drug lists, as there was no mention of them amongst nursing service managers. This finding could be attributed to the fact that decisions relating to drugs administration and dosages were the doctor's responsibility. The literature reviewed also confirms drug lists as important source of information. Cogdill (2003) reported that nurses consulted colleagues and protocol manuals in order to get information about drug therapies and diagnosis. Thomas (2012) conducted a case study of the information needs and information seeking behaviour of nurses at a university trust hospital in Britain where drug therapies, policies and procedures were found to be important sources from which information was sought. Use of the drug lists as an information source is in line with the National Department of Health's essential drug list and guideline framework to the national health system in South Africa.

In their literature review to determine how primary care physicians sought answers to clinical questions, Coumou and Meijman (2006) found that doctors consulted books. Dawes and Sampson (2003) similarly reported that medical doctors also consulted books for information. Books are the first point of access for information by medical doctors before access to additional sources of information in the event that these reference documents are not enough. The findings showed that a significant proportion of medical doctors and professional nurses seldom used library books as a source of information in the hospitals in the OR Tambo Health District surveyed. This finding could be attributed to inadequacies of the convenient libraries, inappropriate material, and time constraints. In addition, a lack of awareness about available library facilities, and a lack of computer

and information literacy skills have been reported to have a negative influence on the use of library books as a source of information in this study. This finding is characteristic of rural health environment in South Africa. Andrews et al. (2005) reported that all rural health professionals did not have the privilege of having access to a variety of information sources that are enjoyed by their colleagues in urban areas. The lack of time, isolation, lack of equipment, inadequate library access, the lack of information skills and inadequate internet infrastructure were found to be major problems (Andrews et al., 2005). The importance of hospitals to provide on-site libraries with relevant up-to-date stock and computer facilities, internet connectivity and information literacy training programme cannot be over emphasised especially rural OR Tambo Health District, which is characterised by the burden of poverty, disease, unemployment and underdevelopment.

The findings moreover revealed that in the absence of reliable internet connectivity in the hospitals, professional nurses, and medical doctors often relied on their own personal mobile cell phones to access the internet in order to access information. This is because cell phones are available, portable, and accessible; and every medical doctor and professional nurse owns one. The use of internet as an information source is documented in literature. Casebeer et al. (2002) reported that the volume of internet usage amongst physicians has been growing rapidly. They further pointed out that internet is invaluable for physicians as it is used for continuing medical education allowing physicians to study from home.

In a study to determine the level of internet usage by medical doctors in Switzerland, Koller, Grutter, Peltenbury, Fischer and Steurer (2001) found that although 75% of respondents had access to the internet, only 7% used it during patient consultations. Murphy et al. (2006) on the other hand conducted a study to ascertain the drug information sources used by nursing practitioners and collaborating physicians in Canada and found that the internet was the least used information source. However, the findings in the survey of hospitals in OR Tambo Health District showed that the consumption of

personal data was a financial burden to both doctors and nurses because of the high cost of data bundles.

The findings also revealed that in-service training, workshops, and seminars were important sources of information for medical doctors and professional nurses. Such in-service training was provided to bridge the gap between theory and practice, refresh, or enable the medical doctors and nurses keep up with current trends and practices in the field. Besides, senior nurses did in-service training for new nurses to improve quality of patient care and upgrading of their practical skills, while medical doctors conducted in-service trainings for all professional nurses where nurses' knowledge was lacking. It was apparent from the interviews that in-service training provided orientation to nurses about the daily activities in their specific workplaces. In addition, orientation was also one of the vehicles through which nurses' responsibilities were made clear to them. The literature reviewed did not find any studies that documented in-service training as a way of accessing information for medical doctors and professional nurses. . In the absence of libraries and internet connectivity, medical professionals and professional nurses seemed to rely on in-service training, workshops, and seminars as alternative sources of information to support their day-to-day tasks. This is probably because workshops are organised for them, at no cost, at convenient times and venues. In addition, the hospitals had time set aside for in-service training in the form of clinical days on Wednesdays in a venue within the hospitals. Muchinsky, Schreuder and Kriek (2003) state that in-service training provides nurses with the necessary skills needed to perform better in their work places. McCaughan et al. (2005) also argue that nurses in general use their personal experience as a primary source of information. Al-Ghabeesh et al. (2012), in a study conducted in Jordan, showed that professional nurses relied on personal experience, what they learned during nursing education, what they have learned from interactions with the patients, discussions between nurses and doctors as well as policy and procedure manuals to do their work.

The findings showed that seminars run by hospital management were used as a common means of accessing information. These seminars were conducted on a regular basis to keep staff up-to-date, transfer information and experiences and refocus efforts to support medical doctors and professional nurses in their everyday tasks. Additionally workshops provided by provincial or district offices were especially relevant to address issues related, for example to new drugs and new forms of drug resistance diseases. Readily available electronic information on relevant topics should be encouraged by the hospitals so that training is not limited only to the designated clinical days. The findings further revealed that district hospitals did not use in-service training provided by the non-governmental organisations. This was attributed to the fact that government had prioritised development of the district health system and primary health care approach and did not provide leeway for hospitals to seek their own service providers. This approach deprived the hospitals additional support necessary for them to play their rightful role within the district health system.

The findings of the study showed that ward rounds were an important source of information. Ward rounds took place every morning, when medical doctors assessed and planned for each patient, in consultation with senior professional nurses. For new medical doctors, ward rounds were an essential aid to learning, a daily opportunity to gain vital information and medical knowledge from more experienced doctors. A study by Acharya, Reyahi, Amis and Mansour (2015) supports this finding. Their study, noted that ward rounds were an important way to overcome barriers to learning and improve learning satisfaction of junior doctors in the work place. They found that ward rounds were an extremely useful tool of learning by junior medical doctors. According to the Royal College of Physicians and Nursing (2012), ward rounds were critical activity that brought together a multidisciplinary team of medical professionals to review and plan patient care. Ward rounds provided also an opportunity for joint learning for health professionals as they shared experiences regarding the condition of patients.

The study findings also showed that a computer at work was used as a means of accessing the internet for information. However, medical doctors and professional nurses seldom used computers as a source of information. This was perhaps attributed to, as revealed by the nursing service managers, that computers and the internet were either not available or inadequate. This was exacerbated by the fact that where computers were available, there was no internet connection. . Though The World Stats (2016) estimated that internet users had increased globally with almost half of the world's population using internet, internet connectivity remains a problem in rural settings of most developing countries such as South Africa. Professional nurses and medical doctors working in rural areas are deprived of internet connectivity, a fact which has been noted by various studies (Winters *et al*., 2007; Schilling *et al.*, 2011; Salman *et al*., 2013). Winters et al. (2007), in their study to determine access to and use of internet amongst rural nurses, reported barriers associated with internet including the lack of skills, time, and access to internet. Hiney (2005) examined the use of internet to support professional development and clinical practice by nurses in Ireland and reported that internet was not used due to internet illiteracy, a lack of support and isolation. Jones et al. (2011) found that factors that prevented nurses from using web-based sources of information included a lack of time to search, a lack of knowledge of the required technology, and a lack of experience. Majid et al. (2011) found that nurses were using minimal electronic resources owing to a lack of search skills and a lack of knowledge about available sources. Ogbomo (2012) and Norbert and Lwoga (2012) reported the lack of internet access as an inhibitor to information seeking. The shortage of computers and unavailability of internet access more likely led to limited computer literacy skills and information literacy skills amongst medical doctors and professional nurses. It is advisable that the hospitals consider installation of computers and internet connectivity in various workstations of the hospitals. This could be augmented by the provision of computer laboratories with internet connectivity to support medical doctors and professional nurses in their patient care-related roles and tasks.

6.6 What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals?

As to factors facilitating or hindering information seeking by health professionals, Leckie et al. (1996) postulated that once the information-seeking process starts, intervening variables either facilitate or hinder the process of information seeking and as a result influence its outcome. Furthermore, Spencely et al (2008) point out that when it comes to information sources used by nurses, context influences the decision to pursue or not to pursue information seeking. Spencely and collegues argue that factors such as organisational culture, administrative support, time to seek information and the availability of up-to-date information sources will support or hinder information seeking by nurses. According to the findings of this study, important factors that facilitated information seeking behaviour of medical doctors and professional nurses included: personal attributes (willingness to learn, exposure to information during undergraduate training, peer pressure and being of younger age), accessibility of the information source; format of the information source; familiarity of the information source; and trustworthiness of the information source.

The findings showed that willingness to learn, exposure to information during undergraduate training, peer pressure and being of younger age were important factors motivating medical doctors and professional nurses to look for information. According to clinical managers and nursing service managers, the critical factor contributing to the successful gathering of information was the individual doctor or individual professional nurse himself or herself. Their willingness to learn, their motivation to make the most of what is available, and the energy with which they approached the task of finding out what they needed to know contributed to information gathering. Personal motivation keeps medical doctors learning, even under difficult conditions, where there is no internet, no library, and no specialist on site.

According to the clinical managers and nursing service managers, peer pressure played an important role as the medical doctor strived to be at the same level as their peers in

terms of medical knowledge. In terms of being of younger age as a factor, Mclnerney and Suleman (2010) observed that younger practitioners had a better understanding of search strategies than older practitioners. Similarly, Dorsch (2000) reported that younger physicians asked more questions than the older physicians. Liverman *et al*. (1997) point out that due to the rapid development of technology, the new breed of health professionals were much more technologically literate, making them more adept computer users and better at accessing information than the old breed of health professionals. Interestingly, personal motivation and willingness to learn are not documented in the literature surveyed as a factor facilitating access to information.

The role played by the characteristics of the information source such as accessibility of the information source; format of the information source; familiarity of the information source; and trustworthiness of the information source in facilitating the information seeking process is documented in international literature. For example, Leckie et al. (1996) identified cost, trustworthiness, and familiarity with information source, accessibility and format as determinants of information source use. The findings revealed that important factors hindering access to information included: the lack of time, lack of computers, lack of technological skill, slow internet/ poor connectivity, lack of physical libraries, irrelevant print material, not knowing how to formulate search questions and a lack of awareness about information sources.

The findings further revealed that medical doctors and professional nurses did not have enough time to access information. The nature of their work required them to spend most of their time with patients. They tended to work long hours and the situation was even worse for those working in understaffed units. The lack of time created inability to consult information sources thereby leading to reliance of limited sources, use of own time or incurring additional costs in order to access information.

This has serious implications for the quality of the in-service training programmes and hospital seminars and quality of patient care related decisions. The lack of skills and

technological infrastructure reported was found to be one of the factors hindering access by medical doctors and professional nurses to information sources.

The findings revealed that the lack of libraries was a stumbling block to information access and where available it was either dedicated to a particular group such as nursing students or far away from the workstations. As a result, medical doctors and professional nurses did not use them nor had knowledge if their colleagues used them. The findings also revealed that not having access to a reliable supply of relevant print material hindered medical doctors and professional nurses in their information seeking activities. The study findings also revealed that some medical doctors and professional nurses lacked information search skills. As a result, some medical doctors and professional nurses were unable to formulate the correct search questions when seeking information. Formulating the right search question is important for information seeking as it increases the chances of getting information that is relevant to one's information need; a key step that determines success or failure in the process of information seeking.

The findings showed that personal attributes and characteristics of the information source facilitated information seeking of medical doctors and professional nurses, whereas the lack of time, information literacy skills, technological infrastructure, and libraries hindered medical doctors and professional nurses from accessing information. The barriers identified have serious implications for the quality of information accessed, quality of patient care provided, quality of teaching, training and learning, and research.

6.7 Summary

This chapter discussed the findings using extant empirical literature and the Leckie *et al*. model of information behaviour that underpinned the study. This study has found that the professional roles and associated tasks of medical doctors and professional nurses in the five selected district hospitals are provision of patient care, teaching, training, and research. Medical doctors and professional nurses need information in order to meet the demands of tasks emanating from patient care, teaching, training, research, general

awareness, personal use, and continuing professional development. Besides, medical doctors and professional nurses preferred use of clinical guidelines, colleagues, hospital procedure manuals, and reference books as sources of information.

The unavailability of computers, lack of internet connectivity and inadequacy or unavailability of libraries, which have become characteristic of rural environment, remains barriers to accessing information sources. In line with international evidence, the findings revealed that interpersonal information sources such as colleagues, medical specialists, ward rounds and in-service training workshops or seminars followed by hospital ward-based print sources such as reference books, clinical guidelines, policy and procedure manuals and drug lists constituted the preferred sources of information in the five selected district hospitals. The findings also showed that personal attributes and characteristics of the information source facilitated information seeking of medical doctors and professional nurses, whereas the lack of time, information literacy skills, technological infrastructure, and libraries hinder medical doctors and professional nurses from accessing information. The barriers identified have serious implications for the quality of information accessed, quality of patient care provided, quality of teaching, training and learning and research.

The findings consistent with international literature generally showed that medical doctors and professional nurses preferred use of clinical guidelines, colleagues, hospital procedure manuals and reference books as sources of information to support their roles, and associated tasks. In contrast the findings revealed that the use of personal mobile phones, ward rounds, and in-service training as preferred sources of information has not been largely documented in literature yet, the hospitals surveyed in OR Tambo district hospital revealed use of these facilities as sources of information. The unavailability of computers, lack of internet connectivity and inadequacy or unavailability of libraries, that characterise rural environment, remain barriers to accessing information by medical and professional nurses. The findings in line with international practice revealed that interpersonal information sources such as colleagues, medical specialists, ward rounds

and in-service training workshops or seminars followed by hospital ward-based print sources such as reference books, clinical guidelines, policy and procedure manuals and drug lists constituted the preferred sources of information in the selected district hospitals.

CHAPTER SEVEN

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This chapter presents the summary of the findings, conclusion, and recommendations of the study organised around the research questions. This study sought to investigate the information needs and information seeking behaviour of medical doctors and professional nurses in five (5) selected district hospitals of the OR Tambo Health District. The study addressed the following research questions:

1) What roles do medical doctors and professional nurses play in the five selected district hospitals of OR Tambo Health District?
2) What tasks do medical doctors and professional nurses play in the five selected district hospitals of OR Tambo Health District?
3) What are the information needs of medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?
4) What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?
5) What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?

The study was underpinned by the post-positivist paradigm. A mixed methods approach incorporating both qualitative and quantitative research approaches was applied by the study with survey design. The population of study consisted of medical doctors and professional nurses in five purposively selected hospitals of OR Tambo district. A survey questionnaire was used to collect quantitative data while in-depth interviews were used to collect qualitative data from nursing service managers and clinical managers. In addition, observation was used to complement data collected through survey questionnaires and interviews. Three sampling methods were used to recruit respondents namely census,

random sampling and purposive sampling. Purposive sampling was used to select five district hospitals inclusion into the study; hospital wards for observations; and clinical managers and nursing service managers for in-depth interviews. Simple random sampling was used to select professional nurses for the survey questionnaires and census method was used to select medical doctors. Quantitative data was analysed using the Statistical Package for Social Sciences (SPSS) to generate descriptive statistics that were used to present data in the form of tables, percentages, histograms and pie charts to allow for the identification of general trends and patterns. Qualitative data was analysed thematically and presented through verbatim narrations. Validity and reliability of the instruments were achieved through pilot and triangulation of data collection methods. Research ethics were complied based on University of KwaZulu-Natal research ethics policy and protocol. In addition, permission was obtained from department of health and the individual hospitals that were surveyed.

7.2 Summary of research findings

The study targeted 205 respondents from which 167 completed and returned the survey questionnaires giving a response rate of 81.5%. In addition five (5) clinical managers and five (5) nursing service managers were targeted and interviewed professional nurses constituted 86.3% of the survey respondents, while medical doctors constituted 13.8%. The findings of this study are summarised below under the relevant research questions:

7.2.1 What role do medical doctors and professional nurses play in the five selected district hospitals of OR Tambo health district?

The findings generally revealed that professional nurses and medical doctors were involved in patient care-related roles in various hospital departments. The findings revealed that medical doctors and professional nurses were responsible for taking care of patients in inpatient care wards (surgical wards, maternity wards, medical wards, and paediatric wards), outpatient care units (OPD, casualty departments), and hospital

theatres. In addition to the patient care role, the findings revealed that medical doctors and professional nurses performed teaching, training and research roles.

7.2.2 What specific tasks do medical doctors and professional nurses perform in the five selected district hospitals?

The findings revealed that medical doctors and professional nurses performed specific patient care related tasks such as attending to patients in outpatients, casualty and the in patient wards; conduct diagnostic investigations; diagnose and treat patients; perform surgical procedures; educate patients and teach health workers and health sciences students. They also performed tasks associated with their teaching and research roles.

7.2.3 What are the information needs of medical doctors and professional nurses in five selected district hospitals?

The findings generally revealed that medical doctors and professional nurses needed information for provision of quality patient care (management of common medical conditions, diagnosis, medication, management of bed capacity, day-to-day running of the hospital, complying with applicable legislation, regulations and procedures), teaching and training, research and continuing professional development. The findings also showed that medical doctors and professional nurses in the selected district hospitals sought information to support their professional roles and associated tasks particularly patient care as well as their general awareness and for personal use.

7.2.4 What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals?

The findings revealed that medical doctors and professional nurses in the hospitals surveyed preferred to use clinical guidelines, colleagues, hospital policy/procedure manuals, personal mobile phones, in-service training, workshops and seminars, reference books, library books, medical specialists and ward rounds as sources of information.

7.2.5 What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals?

The findings showed that important factors that facilitated information seeking behaviour of medical doctors and professional nurses included: personal attributes (such as willingness to learn, exposure to information during undergraduate training, peer pressure and being of younger age), accessibility of the information source; format of the information source; familiarity of the information source; and trustworthiness of the information source.

Similarly the findings revealed that factors hindering access to information included the lack of time, the lack of computers, the lack of technological skills, slow internet/ poor connectivity, the lack of physical libraries, irrelevant print material, inability to formulate search questions and the lack of awareness about information sources.

7.3. Conclusion

The study has established the information needs of medical doctors and professional nurses, information sources, factors facilitating or hindering access, seeking and use of information. It is concluded that the information needs of medical doctors and professional nurses are primarily informed by roles and tasks they perform with regard to patient care, teaching, training, and research.

The findings showed that medical doctors and professional nurses preferred use of clinical guidelines, colleagues, hospital procedure manuals, and reference books and is consistent with international literature. They also used personal mobile phones, ward rounds, and in-service training as preferred sources of information. It is concluded that the use of the internet is yet to be integrated in the performance of medical doctors' roles and tasks largely due to poor connectivity, and unavailability of computers. In addition, the less reliance on internet for accessing information by medical doctors and nurses could also be attributed to limited time to prepare search strategies and search online and inadequate information literacy skills.

It is also concluded that due to heavy reliance on print and interpersonal sources of information, personal attributes and characteristics of the information source were important considerations in the information seeking behaviour of medical doctors and professional nurses. Because of the barriers to accessing and using information by medical doctors and nurses this affected the quality of information accessed and used and also the quality of patient care as well as quality of teaching, training, and research.

It is hoped that the recommendations proffered below will empower those responsible for providing information for medical doctors and professional nurses to improve their services. Factors that have been identified and discussed in the study such as lack of internet access, lack and inadequate library material and lack of information literacy skill demonstrate that there is a need for a health information system that effectively provides relevant and timely health information. Some of the recommendations are proposed in the next section.

7.4 Recommendations

This section presents the recommendations emanating from the findings of the study. The recommendations are aligned with the main research questions that the study sought to investigate.

7.4.1 What roles/tasks do medical doctors and professional nurses play in the five selected district hospitals of OR Tambo Health District?

The study sought to find out the role and tasks medical doctors, and professional nurses do in the five selected district hospitals of OR Tambo Health District. The findings generally revealed that professional nurses and medical doctors were involved in patient-care-related roles as well as teaching, training and research. The findings also revealed that medical doctors and professional nurses performed specific patient care related tasks such as attending to patients in outpatients, casualty and the inpatient wards; conduct diagnostic investigations; diagnose and treat patients; perform surgical procedures;

educate patients and teach health workers and health sciences students. They also performed tasks associated with their teaching and research roles.

Recommendation 1: The study recommends regular surveys of the roles and tasks performed by medical doctors and professional nurses in the district hospitals of OR Tambo Health District in order to keep up-to-date with the demands brought about by the changing burden of disease, policy imperatives such as the implementation of health standards for health establishment; and professional regulations by the Health Professions Council of South Africa and the South African Nursing Council. Conducting regular surveys is more likely to give a better understanding of the roles and tasks in line with the changing environmental and practice context.

7.4.2 What are the information needs of medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?

The findings generally revealed that medical doctors and professional nurses needed information for provision of quality patient care (management of common medical conditions, diagnosis, medication, and management of bed capacity). In addition, the findings revealed that medical doctors and professional nurses need information for the day-to-day running of the hospital, for understanding and complying with applicable government policy, regulations and procedures as well as regulations from professional bodies such as the South African Nursing Council and Health Professions Council of South Africa.

Recommendation 2: The study recommends regular and continuing survey of information needs of medical doctors and professional nurses in district hospitals of OR Tambo Health District in order to ensure that district hospitals understand the information needs of medical doctors and professional nurses, for them to provide relevant accessible real-time affordable and reliable information for informed decision making.

7.4.3 What are the channels and sources of information preferred by the medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?

The findings revealed that medical doctors and professional nurses in the selected hospitals preferred to use clinical guidelines, colleagues, hospital policy/procedure manuals, personal mobile phones, in-service training, workshops and seminars, reference books, library books, medical specialists, and ward rounds as sources of information.

Recommendation 3: The study recommends regular and continuing survey of the sources of information preferred by medical doctors and professional nurses in the district hospitals of OR Tambo Health District. This will help empower district hospitals to make informed collection development decisions.

Recommendation 4: The study recommends that district hospitals should improve access to sources of information including access to physical documents, such as clinical guidelines, hospital procedure manuals, reference books, preferred by medical doctors and professional nurses by making them available in electronic format that can be accessed through personal mobile phones and other internet related devices.

Recommendation 5: Where internet connection is available, the district hospitals should consider setting up an information portal containing sources of information preferred by medical doctors and professional nurses such as: clinical guidelines, hospital procedure manuals, drug lists, reference books and in-service training workshops/seminars with links to the information portals of the Eastern Cape Department of Health, the National Department of Health, other government departments as well as the South African Nursing Council, and the Health Professions Council of South Africa. Where there are no internet doctors and nurses can be provided with an allowance of data bundle to use on their devices such as smart phones and tablets as an interim measure while working on a seamless system that will provide quality information for

doctors and nurses. The doctors complained that data is expensive as they are compelled to use their phones due to lack internet.

Recommendation 6: The study recommends the implementation of an Integrated Electronic Health Record System that is accessible to medical doctors and professional nurses in order to ensure provision of real-time information on patients, conditions/ diagnosis, drugs, supplies, equipment, and bed capacity. Such integrated system will also have in-built systems including clinical guidelines, treatment guidelines, and patient care.

Recommendation 7: The interpersonal sources of information should be promoted in the hospitals using information technology such as telehealth and telemedicine. Videoconferencing links with academic centres could also be used to enhance access to medical specialists' expertise to complement ward rounds, hospital seminars, and in-service training workshops.

7.4.4 What factors facilitate or hinder information seeking by medical doctors and professional nurses in the five selected district hospitals of OR Tambo Health District?

The findings showed that personal attributes (such as willingness to learn, exposure to information during undergraduate training, peer pressure and being of younger age), accessibility of the information source; format of the information source; familiarity of the information source; and trustworthiness of the information source facilitated information seeking of medical doctors and professional nurses. The findings further revealed that the lack of time; the lack of computers; the lack of technological skills; slow internet/ poor connectivity; the lack of physical libraries; irrelevant print material; inability to formulate search questions; and the lack of awareness about information sources, were hampering information seeking by medical doctors and nurses.

Recommendation 8: The study recommends that the district hospitals should consider exposing medical doctors and professional nurses to information sources during their pre-

service and undergraduate experience. This could be achieved by integrating information aspects such as information literacy in the undergraduate curricula for medical doctors and professional nurses.

Recommendation 9: The study recommends that district hospitals in the OR Tambo Health District should promote information seeking by medical doctors and professional nurses as an integral component for providing quality patient care. The district hospitals should therefore conduct information sessions informing medical doctors and professional nurses to emphasise the importance of information seeking for learning and supporting patient care, teaching and research purposes.

Recommendation 10: District hospitals should ring fence time for medical doctors and professional nurses to allow them space to search information sources. This would help to establish a culture of information seeking amongst medical doctors and professional nurses, in various sections of the hospitals as well as increase utilisation of available information sources. The district hospitals should also ensure that requisite sources of information for medical doctors and professional nurses are accessible beyond normal working hours in order to cater for those working on both day and night shifts.

Recommendation 11: The study recommends that district hospitals should, with the support of the provincial Department of Health, explore ways to install computers and internet connectivity in various workstations of the hospitals where medical doctors and professional nurses work. This would help provide convenient access to information for medical doctors and professionals and reduce the need to look for information from sources away from the workstation.

Recommendation 12: The study recommends that the district hospitals should establish libraries equipped with relevant up-to-date books, electronic databases, computer laboratories, and internet connectivity to meet the information needs of medical doctors and professional nurses. These libraries should be located within reasonable distance from the stations where medical doctors and professional nurses work.

7.5. Contribution of the study

This study contributes to policy, theory, and practice. From the policy perspective, the findings of the study provide a framework upon which collection development policies related to the provision of information for medical doctors and professional nurses in public hospitals in the South African context could be based. In addition, the findings of this study may be used to inform the information reforms necessary to support the ongoing implementation of the National Health Insurance (NHI) reforms.

Practically, better understanding information behaviour of medical doctors and professional nurses will assist information providers such as the Eastern Cape Department of Health, hospitals, higher education institutions, health science libraries and health resource centres in the Eastern Cape to provide resources to meet information needs of medical doctors and professional nurses. The findings of this study are in pursuit of the "Health Information for All by 2015" campaign run by the Global Healthcare Information Network (HIFA) that envisages health professionals have access to adequate quality and relevant information by the year 2015 around the world. Theoretically, the study also contributes to the body of literature on information behaviour of medical doctors and professional nurses from the perspective of South Africa and the developing world.

The overarching goal of the study was to determine the information behaviour of medical doctors and professional nurses using Leckie *et al*.1996 general model of the information seeking of professionals. The model proved to be congruent with objectives of the study and provided a suitable framework to answer all the research questions. The model answered the question articulated to establish the roles and associated tasks of medical doctors and professional nurses. As per the model, information needs stem from the tasks professionals perform emanating from their roles in the organisation. The second question sought to understand information needs of medical doctors and professional nurses and *Leckie et al.* refers to information needs as the phase that marks the stage of information seeking. The question provided awareness of what doctors and nurses need

information for. The model further assisted in providing an understanding of channels and sources of information used by doctors and nurse. The intervening variables that start working as soon as the process of seeking information starts as identified in Leckie models were also recognised. Out of all the models reviewed Leckie *et al.* was found most appropriate one for this study.

7.6. Originality of the study

Several studies on information behaviour of various health professional groups have been undertaken around the world (Alghanim, 2011; Bennett *et al*. 2005; Bryant 2004; Norbert & Lwoga 2012; Gonzelez-Gonzelez *et al.,* 2007). However, these studies have largely focused in the primary health care settings. In addition, studies on information behaviour of medical doctors and professional nurses have generally concentrated on one aspect of information behaviour such as information sources or information needs and less on the totality of information behaviour of health professionals (Callen *et al*., 2007; Naidoo *et al*., 2010; Tumwikirize *et al*., 2008). Besides, while many studies of information behaviour of health professionals have been conducted around the world in particular the developed world, limited studies have been undertaken in the South African context. For example, an overview of literature on information behaviour in South African context by Stillwell (Stilwell, 2010) revealed a significant number of articles published from 2000 on information behaviour. However, the results of this review demonstrate very little research concerning understanding information behaviour of medical doctors and professional nurses in South Africa. In addition, while here is also a significant research concerning information behaviour of health professionals such as medical doctors, professional nurses, and pharmacists in various African countries. These have not been replicated in South Africa as revealed by a search on databases such as Library and Information Abstract (LISA), and SABINET, MedlinePlus and PubMed.

From the South African context only Fourie and Claasen-Veldsman conducted an exploratory study of the needs of South African oncology nurses working in specialised unit. Similarly, in 2009 Fourie undertook a literature review of information behaviour of health professionals, including medical doctors and professional nurses but the study only focused on emotions and scope internationally and not in South Africa (Fourie & Claasen-Veldsman, 2011). The departure of the current study is that its focus is on the information behaviour of medical doctors and professional nurses in South Africa.

In addition this study investigated information behaviour of medical doctors and professional nurses in a rural setting. This is the geographical setting that has not been investigated in South African context regarding both medical doctors and professional nurses. The research therefore contributed to the literature by bringing to the fore an insight on information behaviour of these two groups of medics in a rural setting in a South African context.

7.7. Suggestions for further study

This study investigated the information behaviour of medical doctors and professional nurses in five (5) district hospitals of the OR Tambo Health District. The study examined the information needs, information seeking process, information sources, and the factors influencing information behaviour of medical doctors and professional nurses. The study contains some limitations that form the basis for future research.

Firstly, while this study focused on medical doctors and professional nurses as broad professional groups, there was no investigation of the information behaviour of medical doctors in specific disciplines or settings such as obstetrics and gynaecology, surgical practice or paediatric practice in the district hospital setting. In addition, there was no investigation of the information behaviour of professional nurses in specific settings or specialties such as medical wards, surgical practice, theatre, midwifery, paediatrics, or intensive care in the district hospital setting. Future research could investigate information needs of and information sources used by professional nurses working in

theatre or maternity in a district hospital setting, as well as factors influencing their information behaviour.

Secondly, this study reported that medical doctors and professional nurses used certain information sources in order to satisfy their information needs. The study did not delve into the intricacies of understanding as to why medical doctors and professional nurses chose to use particular sources of information more than others. It would be beneficial in future research to consider investigating why medical doctors working in district hospitals preferred to use their mobile phone as a source of information. Lastly, the study focused on medical doctors and professional nurses in a district hospital setting. It did not include regional hospitals, specialised hospitals and tertiary hospitals. The hospitals included are situated in rural settings of Eastern Cape. The study did not include other nursing categories such as nursing assistants and staff nurses. Future research could consider investigating the information behaviour of medical doctors or medical specialists in tertiary, regional, and specialised hospitals.

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APPENDICES

APPENDIX 1: Interview Guide

Interview Guide for Clinical Managers /Nursing Service Managers

Key Informants:

- **Clinical Managers**
- **Nursing Service Managers**

My name is Nombulelo Chitha; I am an information science researcher from Kwa-Zulu Natal University. I am doing a research study, which seeks to explore information behaviour of medical doctors, and professional nurses, use, channels and sources of information and factors that facilitate or hinder seeking of information by doctors and nurses. The objectives of the study are as follows:

1. To determine the information needs of medical doctors and professional nurses in the district hospitals
2. To determine the information seeking habits of medical doctors and professional nurses
3. To find out the channels and sources of information preferred by district hospital-based medical doctors and professional nurses
4. To examine factors facilitate or hinder information seeking of district hospital based

With your permission, I would like to have 30 minutes of your time to ask you about the information behaviour of medical doctors /professional nurses in your hospital?

1. What is your understanding of the information needs of medical doctors in a hospital setting? Is there a difference between information needs of medical doctors?

2. In your understanding, what are the specific responsibilities that medical doctors/professional nurses carry out?

3. How are the roles and responsibilities communicated to medical doctors/professional nurses?

4. According to your understanding, how do medical doctors/professional nurses look and use information

5. According to your understanding, does the hospital have systems in place for providing information required by medical doctors/professional nurses for their day-to-day tasks? If you have a system, what are strengths/weaknesses of the system?

6 What factors make it easy to have access to information; in order to meet the information needs of medical doctors/professional nurses?

7. According to your understanding, what factors stand in the way of looking for information by the medical doctors/professional nurses?

8. What policies are available that governs provision and use of information by medical doctors/professional nurses?

9. Does the hospital have the necessary infrastructure, people or money to make information available to support medical doctors /professional nurses in their everyday practise?

10. Please share with us, your program for building capacity on available information systems to support use of available information sources by medical doctors/professional nurses.

APPENDIX 2: Questionnaire

QUESTIONNAIRE

My name is Nombulelo Chitha; I am an information science researcher from Kwa-Zulu Natal University. I am doing a research study, which seeks to explore information behaviour of doctors, and nurses, their roles, their tasks, use, channels, and sources of information and factors that facilitate or hinder seeking of information by medical doctors and professional nurses. The objectives of the study are as follows:

1. To determine the roles and tasks of medical doctors and professional nurses in the district hospitals
2. To determine the information seeking habits of medical doctors and professional nurses
3. To find out the channels and sources of information preferred by district hospital-based medical doctors and professional nurses
4. To examine factors facilitate or hinder information seeking of district hospital based medical doctors and professional nurses

With your permission, I would like to 30 minutes of your time to ask you the following questions.

Demographic Profile

South Africa-born		**Male**		**Medical Doctor**	
Non-South Africa-born		**Female**		**Professional Nurse**	
Age		**Years of service**			

Name of Hospital

Holy Cross Hospital	**1**	**Dr Malizo Mpehle**	**2**	**St Barnabas Hospital**	**3**	**Zithulele Hospital**	**4**	**St Elizabeth**	**5**

		Hospital						**Hospital**	

Organisational Status

Clinical Manager	**1**	**Nursing Operational Manager**	**3**	**Quality Assurance Officer**	**5**	**Infection Control**	**7**
Medical Officer	**2**	**Nursing Service Manager**	**4**	**Nursing Area Manager**	**6**	**Professional nurse**	**8**

1. Where are you working? Please tick the appropriate box

OPD		**Casualty**		**Maternity**		**Paediatric ward**		**Female ward**		**Male ward**		**Theatre**	

2. What are your responsibilities in the hospital?

I am responsible for the paediatric ward	
I am responsible for theatre	
Responsible for male medical ward	
I am responsible for female medical ward	
I am responsible for maternity	
I am responsible for male surgical ward	
I am responsible for female surgical ward	
I am in charge/ responsible of the outpatients department	
I am in charge of the casualty department	
I am the overall doctor-in-charge in the hospital	
Other	

3. What specific tasks are you performing in your hospital? Please indicate how often you perform those tasks

Tasks	**Seldom (1)**	**Often (2)**	**Always (3)**
See patients in outpatients during the day			
See patients in casualty during the day			
See patients in casualty after hours			
Perform ward rounds to see patients admitted in the wards			
Perform caesarean sections			
Perform minor procedures			
Request and interpret blood investigations to diagnose patient			

illnesses			
Request and interpret x-ray investigations to diagnose patient illnesses			
Prescribe treatment for sick patients			
Educate patients about their illnesses			
Give treatment to patients			
Review progress of patients on treatment			
Teach health workers and health sciences students in the hospital			
Review mortality statistics			
Conduct folder reviews			
Review complaints made by the patients			

4. Where do you look to get information in order to meet your needs? Please indicate how often you use that specific source.

	Seldom (1)	**Often (2)**	**Always (3)**
I talk to colleagues			
I consult doctors			
I consult senior nurses			
I talk to people outside of your work			
I read newspapers			
I use my mobile phone to access internet			
I use computer at work to access internet			
I use reference books kept in the hospital			
I use protocols/guidelines kept in the ward or my pocket book			
I consult the hospital policy manual			
I use library books			
I attend seminars run in the hospital			
I attend training workshops organized by non-governmental organisations			
I attend training workshops organized by provincial office			
I attend training workshops organized by district office			

I use Mindset facilities available in the hospital			

5. For what reasons do you seek information? Please indicate how often you seek information for a specific reason.

Reasons for seeking information	**Seldom (1)**	**Often (2)**	**Always (3)**
For patient care			
For personal use			
For CPD (continued professional development			
General awareness			
Research			
Teaching			
Other reason (Please specify)			

6. Please indicate amount of time you spent per day on information seeking activities

Time spent on information seeking activities	**Please tick**
0-15 minutes	
15minutes- 30 minutes	
30 minutes – 1hour	
1hour- 1 and half hour	
1 and half- 2 hours	

7**. What informs your choice of information source? Please tick appropriate box and level of importance**

Factor	**Somewhat important (1)**	**Important (2)**	**Very important (3)**
Accessibility of the information source			
Format of the information source			
Cost of the information source			
Familiarity with the information source/ awareness of the information source			
Trustworthiness of the			

information source			

8. **What factors hinder you in seeking information? Please tick appropriate box and level of importance**

Factor	**Somewhat important (1)**	**Important (2)**	**Very important (3)**
Time taken to access information			
Cost of accessing information			
Lack of Online access			
Lack of skill to search the online resources			
Slow internet			
Lack of Physical library			
No Print material			
Print material not relevant			
Do not know how to formulate search questions			
Lack of awareness about information sources			
Other			

9. How would you rate yourself in the following areas of information use? Please indicate whether you agree or disagree by ticking 1= strongly disagree; 2= disagree; 3= not sure; 4= agree; 5= strongly agree

	Question	**1**	**2**	**3**	**4**	**5**
1	I am aware of all information sources that are available in my hospital					
2	I use all information sources that are available in my hospital					
3	I do not care whether there are information sources provided in my hospital					
4	I always consult information sources for clinical decisions					
5	I consult print material (books, journals) from the library					

6	I use computer at work to access online information					
7	I use my mobile phone to access online information					
8	I use my book collection					
9	I understand the importance of information in my work					
10	I consult information sources for professional development					
11	I consult information sources for teaching					
12	I only consult information sources for personal purposes					
13	Access to information improves quality of patient care					
14	Consulting information sources assist me to diagnose my patients					
15	Consulting information sources assist me in treating my patients					
16	Consulting information sources assist me in the prognosis of my patients					

APPENDIX 3: Observation guide

Structured observation guide for observing information behaviour of medical doctors and professional nurse in selected district hospitals

This observation guide is developed in line with the research questions. The purpose of this observation guide is to guide the researcher on things to look at when observing behaviours of medical doctors and professional nurses as they perform their daily activities, in order to answer the research questions.

Situation: ----------

Location and time: ----------

Who is involved in the action and what role is s/he playing:

Nurse ----------

Doctor

Describe behaviour:

1. What is information needed for: ----------

----

2. How information is sought and used: ----------

----

3. What are channels and information sources consulted: ----------

----

----

4. What facilitates or hinder information seeking: ----------

----

---

5. **Any non-verbal cues explaining information behaviour of doctors and nurses:** ----------

---

Researcher: Ms. Nombulelo Chitha
Institution: University of KwaZulu-Natal
Telephone number: 072 462 9811
Email address buli.chitha@gmail.com

Supervisor: Prof Stephen Mutula
Institution: University of KwaZulu-Natal
Telephone number: 033-260 5093
Email address: Mutulas@ukzn.ac.za

APPENDIX 4: Ethical Clearance Certificate

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

12 November 2015

Ms Nombulelo Chitha (214584770)
School of Social Sciences
Pietermaritzburg Campus

Dear Ms Chitha,

Protocol reference number: HSS/1136/015D
Project title: Investigating information seeking behaviour of medical doctors and professional nurses from selected hospitals of OR Tambo District in the Eastern Cape Province : South Africa

Full Approval – Expedited Application
In response to your application received on 14 August 2015, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL.**

CONDITION: Gatekeeper permission letter to be forwarded through to Ethics Research Office once obtained.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....
Dr Shenuka Singh (Chair)

/ms

cc Supervisor : Professor S Mutula
cc Academic Leader Research: Professor Sabine Marschall
cc Administrator : Ms Nancy Mudau

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
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Website: www.ukzn.ac.za

APPENDIX 5: Internal Memorandum

Province of the
EASTERN CAPE
HEALTH

DISTRICT MANAGER'S OFFICE
Room 41 • 9th Floor • Botha Sigcau Building • Cnr Owen & Leeds Streets • Mthatha • Eastern Cape
Private Bag X5005 • Mthatha • 5099 • REPUBLIC OF SOUTH AFRICA
Tel: 047 502 9083. Fax +27 (0)47 532 3995 •Website: www.ecdoh.gov.za

INTERNAL MEMORANDUM

TO:	**THE HOSPITAL CEO's O.R TAMBO DISTRICT MTHATHA**
FROM:	**DISTRICT MANAGER: O. R TAMBO**
SUBJECT:	**PERMISSION TO CONDUCT STUDY:MRS CHITHA**
DATE:	**25/01/2016**

Purpose

The purpose of this memorandum is to inform O.R. Tambo Health District staff and patients of permission granted on a research study to be conducted by Mrs CHITHA towards a Master's degree with Walter Sisulu University.

Background

Mrs Chitha is currently enrolled for a Master's degree at Walter Sisulu University. The research topic is Investigating information seeking behaviour of medical doctors and Professional nurses from selected hospitals of O.R. Tambo in the Eastern Cape Province, South Afrca.
She has requested permission to do research in different hospitals in O.R.Tambo.

Mrs Chitha has submitted all the required documents for a research study in the Eastern Cape Department of Health facilities and as such permission has been granted

to her by the Research unit to conduct the study in terms of her research protocol and methodology.

Approval by the district

Kindly note that this memorandum serves as an approval at district level for Mrs Chitha to conduct her research study in terms of the approved research protocol, ethical clearance and permission letter from the research unit.

APPROVED

District Manager O.R Tambo

.....**Date**.....27/01/2016

APPENDIX 6: Participant Information and Consent Forms

University of KwaZulu-Natal
School of Social Sciences and
Information Studies Programme
Private Bag X01Scottcville
3209, PMB

Telephone: +
+27743779236
Email:

12 June 2015

Dear Respondent

Informed Consent Letter

Researcher: Ms. Nombulelo Chitha
Institution; University of KwaZulu-Natal
Telephone number: 072 462 9811
Email address buli.chitha@gmail.com

Supervisor: Prof Stephen Mutula
Institution: University of KwaZulu-Natal
Telephone number: 033-260 5093
Email address: Mutulas@ukzn.ac.za

I, Nombulelo Chitha of University of KwaZulu-Natal, kindly invite you to participate in the research project entitled "Investigating information behaviour of medical doctors and professional nurses in from selected hospitals of OR Tambo District in the Eastern Cape Province: South Africa".

This research project is undertaken as part of the requirements of the award of PhD degree (Information Studies), at the University of KwaZulu-Natal.

It should take you about 30 minutes to complete the questionnaire/ interview. You are requested to respond to questions that related to your information needs, information source you use, how you seek information, what informs your decision to seek information. Interviews will be conducted at your place of convenience and will be tape

recorded. There is no anticipated discomfort or any danger that the respondent might suffer by participating in this research project.

Your participation in this research project is voluntary. You may decline to participate or withdraw from the research project at any stage and for any reason without any form of disadvantage. There will be no monetary gain from participating in this research project. Confidentiality and anonymity will be maintained by the researcher and the Information Studies Programme, at the University of KwaZulu-Natal.

If you have any questions or concerns about participating in this study, please feel free to contact myself or my supervisor at the contacts provided above.

Following the completion of the study, findings will be shared with you, the respondents I will visit all the sites where study took place to make presentations.

Thank you for participating in this research project.

---------- ----------
Signature Date

I ..... hereby consent to participate in the above study.

Name: ..... Date: ..... Signature: .....

Supervisor's details

Prof Stephen Mutula
Institution: University of KwaZulu-Natal
Telephone number: 033-260 5571
Email address: Mutulas@ukzn.ac.za

Student's details

Ms Nombulelo Chitha
Institution; University of KwaZulu-Natal
Telephone number: 072 462 9811
Email address: buli.chitha@gmail.com

Should you have any questions regarding this study/ the interviews or wish to report any problems you have experienced related to the study, please contact Dr. Shenuka Singh (Chair: Research Ethics Office at the University of Kwa-Zulu Natal, Private Bag x54001, Durban, 4000, E-mail: HssrecHumanities@ukzn.ac.za, Telephone: (031) 260 3587.

CONSENT TO AUDIO TAPE-RECORD INTERVIEWS

If you consent to partake in the study could you please tick an option regarding audio tape-recording:

I have read the project information sheet and it has been properly explained to me and I understand that it is up to me whether or not the interview is tape-recorded.

The purpose of recording the interview is to capture accurately all the information that will be given.

It will not affect in any way that the interviewer treats me if I do not want the discussion to be tape-recorded.

I understand that if my participation is tape-recorded that the recording will be destroyed 2 years after publication of findings

I understand that I can ask the person conducting the interview to stop tape recording, and to stop the interview altogether, at any time.

I understand that my name will not be used for the recorded interview.

___ Yes, I agree to be **audio taped** during my participation in this study.
___ No, I do not agree to be **audio taped** during my participation in this study.

_____
Interviewee's name and signature

_____
Interviewer's name and signature

Date: _____

Witness consent (in the case that the interviewee is illiterate). I _____ (witness name) hereby confirm that this information sheet has been read and explained to _____ (interviewee name) and that the interviewee hereby gives their consent, willingly and freely for the interview to take place and for it to be tape-recorded.

_____

Witness name and signature

Following the completion of the study, findings will be shared with you, the respondents I will visit all the sites where study took place to make presentations.

Should you have any questions regarding this study/ the interviews or wish to report any problems you have experienced related to the study, please contact Dr. Shenuka Singh (Chair: Research Ethics Office at the University of Kwa-Zulu Natal, Private Bag x54001, Durban, 4000, E-mail: HssrecHumanities@ukzn.ac.za, Telephone: (031) 260 3587.

APPENDIX 7: Editor's Letter

31 January 2017

TO WHOM IT MAY CONCERN

This is to confirm that I assisted Mrs. Nombulelo Chitha with the language editing of her thesis '**Information Behaviour of Medical Doctors and Professional Nurses in Selected Hospitals of OR Tambo Health District, Eastern Cape Province, South Africa'**. I went through the draft making corrections and suggestions with respect predominantly to language usage and punctuation.

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APPENDIX 8: Table 1: Summary of information needs studies conducted in Africa

Author and Year	Country	Health Professional Group Studied	Study Topic	Methodology & Findings
Ajuwon, (2006)	Nigeria	172 doctors	Use of the Internet for health information by physicians for patient care in a teaching hospital in Ibadan, Nigeria	Out of the 98% respondents who have used the internet, 90% used it to access information for patient care.
Nwagwu and Oshiname, (2009)	Nigeria	240 nurses were involved in the study.	Information needs and seeking behaviour of nurses at the University College Hospital, Ibadan, Nigeria	Survey questionnaire; Majority of nurses (94%) needed information to improve their knowledge, while only 28, 5 % needed information for patient care

Author and Year	Country	Health Professional Group Studied	Study Topic	Methodology & Findings
				reasons.
Ocheibi and Buba, (2003)	Nigeria	158 doctors	Information needs and information gathering behaviour of medical doctors in Maiduguri, Nigeria	Survey questionnaire; Doctors needed information specific to medical conditions to enhance their knowledge on a daily basis.
Ogunyade and Obajemu, (2006)	Nigeria	300 Health professionals (group of health professionals not specified)	Use of information resources in some selected health science libraries by health professionals	Questionnaire, interviews and observations; 80 % needed information for patients, while other things such as teaching, reference, and

Author and Year	Country	Health Professional Group Studied	Study Topic	Methodology & Findings
			in Lagos, Nigeria	research follow.
Shabi et al., (2008)	Nigeria	94 doctors	Information needs of family physicians in Nigeria	Survey questionnaire; Developments in areas of specialisation (87.3%) drug information (74.2%) regulation on healthcare (70.2%) routine patient care (65.9 %)
Norbert and Lwoga, (2012)	Tanzania	215 doctors	Information-seeking behaviour of physicians in Tanzania	Survey questionnaire; Information on patient care to improve the existing knowledge of

Author and Year	Country	Health Professional Group Studied	Study Topic	Methodology & Findings
				doctors was the main motive for information seeking.
Fourie, (2008)	South Africa	Health professionals (types of health professionals not specified)	Learning from research on the information behaviour of healthcare professionals: a review of the literature 2004–2008 with a focus on emotion	Review of existing literature; Although the need to fill a knowledge gap exists, among other things, difficulties were identified in expressing the needs.
Fourie and Claasen-Veldsman, (2011)	South Africa	Nurses in an oncology centre	Exploration of the needs of South African oncology	Questionnaire, focus groups and structured interviews; Nurses in

Author and Year	Country	Health Professional Group Studied	Study Topic	Methodology & Findings
			nurses for current awareness services available through the Internet	oncology Centre did not think they needed to search additional information for patient care.
Musoke, 2000	Uganda	Health workers (type of health workers not specified) and women leaders	Access and use of information by primary health care providers in rural Uganda: A Qualitative Approach	Semi-structured interviews; Respondents reported on differences information made in their professional and person lives and frustration they went through when they couldn't access

Author and Year	Country	Health Professional Group Studied	Study Topic	Methodology & Findings
				information.
Ogbomo, 2012	Nigeria	Health professionals, comprising 4 doctors and 10 nurses, 1 medical director, 5 pharmacists, 13health assistants, 21 community health workers and 6 laboratory assistants	Information needs of rural health professionals in the tuberculosis and leprosy referral centre Delta State, Nigeria	Ex-post facto research; 80 % of respondents needed information related to diagnosis of certain ailments. Other information needed related to referrals, pharmaceutical companies, research reports on cures of diseases and availability of medical

Author and Year	Country	Health Professional Group Studied	Study Topic	Methodology & Findings
				facilities.