Information needs and information seeking behaviour of Libyan doctors working in Libyan hospitals

By
Ali Salem Khalil Mohamed Arraid

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Supervisors: Dr. Janet Harrison & Dr. Mark Hepworth

Department of Information Science
Loughborough University

Abstract

Objective: The aims of this study were to examine urban and rural doctors' information needs and information seeking behaviours; review their use of information channels; sources; information and communication technologies and to assess their information literacy. It was expected that this would inform future efforts that support doctors in their daily care of patients.

Methodology: A multi-method approach was used in this study. The main reason for that was to increase understanding gained from the quantitative data by obtaining more in-depth information from qualitative data and to integrate the advantages of both methods. Concurrent triangulation strategy was chosen to conduct the quantitative and qualitative study. An exploratory survey was the research method, and a paper based questionnaire and face to face interviews (along with critical incident techniques embedded in the interview) were the research techniques used to gather data.

Results: out of 1029 questionnaires that were distributed 334 (32.46%) were returned. The valid responses were 256 (24.88%). Patient data, disease information, drug information, medical images & lab results, medical complications and guidelines were the main types of doctors' information needs. Education and clinical practice were the main contexts that give rise to doctors' information needs. Ambiguity, uncertainty, rare diseases and the multiplicity of options were the motivations for information needs. Updating, answering colleagues/patient questions and writing research papers were the purposes for which information was used. Personal library and human sources were the heavily used channels to access information. Books rather than journals was indicated the top information source. In addition, more than a quarter of urban doctors and 41.5% of rural doctors ranked online databases as the last source to be consulted. The majority of doctors indicated a difficulty in obtaining electronic information particularly from online databases; moreover the majority reported that sometimes they would like to have the search performed by a mediator. The majority demonstrated that they use field search and more than one term, but there was less use of Boolean parameters or truncation in the search strategies. Availability, ease of access and

use, integration in the work environment and information skills were the main types of barrier to using information sources, particularly electronic sources.

Summary, the study identified that context, such as clinical work, where a particular task e.g. decision making leads to information needs. These may lead to information seeking behaviour to fulfil the need. However, doctors' information seeking encountered barriers that hampered the fulfilment of information needs.

Dedication

I dedicate this PhD. study to the loving memory of my sisters Fariha and Fatma. I wish if they were here to see this work.

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All praise and gratitude be to Allah, the mighty and majestic, for enabling me to reach this stage of my study for PhD.

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Chapter one the Research framework

1.1 Introduction

It could be argued that the ultimate objective of health institutions is to provide health care services to those in need at a reasonable cost. This may not be achieved on the ground without systematic use of available information and knowledge.

The lack of information and knowledge in health care centres could lead to serious problems for patients, such as physical disability, financial loss and in the worse case death. Therefore, an intensive reliance on information and communication technology (ICT) and establishing information systems (IS) that enable access, use and communicate information within the health care sector is essential to avoid such problems. In addition, ICT and IS can be applied in all health care centres, private clinics, and hospitals, whether they are major or small hospitals.

Where doctors play a key role in the health care system, it is vitally important that the health information system should be able to meet their information needs and respond to their preferences. It is worth mentioning that the information system per se may not be able to respond to the beneficiaries' needs, unless needs have already been expressed. Consequently, it is assumed that building and developing a health information system should be preceded by an accurate understanding of the information seeking behaviour and the information needs which motivate the beneficiaries to seek information.

Bearing in mind the importance of health information systems in satisfying the health professionals' information needs and the central role of the doctors in the health care services, this study investigates the information needs and the information seeking behaviour of a sample of Libyan doctors working in a rural area and a sample of Libyan doctors working in an urban area in Libyan hospitals.

However, this chapter provides detailed and comprehensive information about the overall framework of the study. It starts with an indication of the study structure followed by the purpose of the study. Then it introduces the problem of

the study and shows its importance. Next it indicates the aim of the study after that the objectives of the study. Finally it presents the research questions.

1.2 The study structure

This PhD study is divided into eight chapters. The first chapter provides the framework of the study. The second chapter discusses the previous literature in the field of the study. The third chapter discusses the methodology issues and presents the study focus and the methodology that was chosen for this study. The fourth and fifth chapters present the results of the quantitative study regarding doctors' information needs and information seeking behaviour, chapters six and seven present the qualitative results of information needs and information seeking behaviour and chapter eight discusses both the qualitative and quantitative results and makes comparisons with results from previous studies. Finally chapter nine draws conclusion for the final results and makes recommendations for further studies.

1.3 The Purpose of the study

It is proposed that doctors who practise in rural areas might have different information needs compared to their counterparts in the urban areas due to the very different environment they practise within. The different environments may result in differences in access to information sources and hence a difference in their information seeking behaviour. However, although other studies in the health domain have not shown dramatic differences between rural and urban doctors, the studies did not engage in a direct comparison between doctors, and surveyed other groups such as nurses rather than dealing with doctors as a distinct group. Furthermore, based on a search on LISA and MEDLINE databases no similar work has been identified on this topic in Libya. There has been research on this general area in the USA and European countries but it is assumed that the different environment and the culture in Libya might lead to new insights. Therefore, the purpose of this study is to investigate the information needs and the information seeking behaviour of a sample of Libyan doctors who work in an urban area and in a rural area in Libya.

1.4 Statement of the problem and its importance

It is assumed that doctors' need for information, within the context of their daily work, leads to the use of different types of resources to obtain this information. These resources might be about the patient for instance, the patient record, diagnostic information, the examination results and the patient themselves, or indirect resources relevant to the patient's condition such as libraries, medical literature (paper or electronically based) and personal contacts, for instance, colleagues and experts. Critically, doctors are usually busy and do not have enough time to search extensively for information to answer their clinical questions from the indirect resources (Ely et al. 2002 and Lappa 2005). Gonzalez-Gonzalez et al. (2007) concluded that primary care doctors answer only one out of five of their clinical questions during consultation. Furthermore, doctors need the most relevant, accurate and up to date information while they are with the patient in the examination room to provide high quality services (Dee and Blazek 1993, Ely et al. 2002).

It is, therefore, important to help them to obtain the most relevant information at the time of need. As a consequence the provider of information services have attempted to design services for the medical profession and to assist the doctors in their daily practice. However, there is a lack of understanding of the information needs and the information use of the doctors making it difficult to know whether such services satisfy the doctors' information needs. A better understanding of these needs could lead to a better assessment of these technologies. Furthermore, such understanding of information behaviour might put the information provider in a better position to design and develop appropriate information systems that respond to the doctors' information needs in rural and urban areas.

Therefore, a decision has been made to fill the gap and contribute to the literature in this area by carrying out a study to discover and understand the information needs and the information seeking behaviour of a sample of Libyan doctors who work in an urban area and sample of Libyan doctors who work in a rural area in Libyan hospitals.

1.5 The study aim and objectives

1.5.1 The study aim

The main aim of the study is to attempt to understand the information needs and the information seeking behaviour of a sample of Libyan doctors who work in an urban area and those who work in a rural area in Libyan hospitals.

1.5.2 The study objectives

The study has the following objectives:

- To identify the information needs of urban and rural Libyan doctors working in Libyan hospitals.
- To identify the situations and the personal contexts that are associated with the information needs of urban and rural doctors working in Libyan hospitals.
- To identify how urban and rural doctors working in Libyan hospitals seek information.
- To identify whether the medical libraries and librarians have any influence on the information seeking behaviour of urban and rural doctors working in Libyan hospitals.
- To identify the information sources utilized by urban and rural doctors working in Libyan hospitals.
- To identify the information channels utilized by urban and rural doctors working in Libyan hospitals.
- To identify the characteristics of the preferred information sources.
- To identify the obstacles that hamper urban and rural doctors, working in Libyan hospitals, from satisfying their information needs.

1.6 The study questions

The study identified two main questions and within each question there are several related sub questions:

What are the Libyan doctors' information needs?

- What type of information do they need?
- What are the situations that give rise to the information needs or how they experience the information need?
- Are there any differences between the urban and rural doctors' information needs?

What is the Libyan doctors' information seeking behaviour?

- How do they seek information?
- What channel do they utilize to acquire information?
- Are there any differences between the urban and rural doctors in the channel(s) that they utilize to acquire information?
- What information sources do they utilize?
- Are there any differences between the urban and rural doctors in the information sources they utilize?
- What are the obstacles that rural and urban doctors encounter when seeking information?

Chapter two The Literature Review

2.1 Introduction

This chapter is a review of the previous literature that covered doctors' information needs and their information seeking behaviour. The chapter starts with a general discussion of the issues related to information behaviour. The chapter discusses the terminology related to information behaviour. Then it discusses the information behaviour models and the influential factors suggested by these models that have an impact on the users' information behaviour. After that, doctors' information needs and their information seeking behaviour are the focus of the rest of the chapter.

2.2 Terminology associated with information behaviour

It appears from the literature about information behaviour that different terminologies with various definitions have been used. Below is a discussion of the critical terminology in this area.

2.2.1 Information needs, demands and wants concept

Many writers (Nicholas 2000; Wilson 2000b and Case 2006) have stated that numerous people use the term 'information needs' without recognising the real meaning of the term, for instance some people tend to use the term "need" to express what might be "want", or there could be overlap with the term "demand". Although wants and demands might be clear indications of need and worth noting, they are different from need and require definition. Green (1990) presumed that in spite of the complications and problems involved in analysis of need itself, because it is an inner mental state that might interfere with other inner states such as believing and wanting, it seems to be necessary to think about the conception of need, and to discover the difference between information needs, demands and wants.

According to Green (ibid), need is an 'influential tool', which could lead to or rather help to achieve specific objectives, for instance the need to read (influential tool) 'to understand some ideas' to write a research paper (specific objective). What is more he argues that need, on the contrary to want, could be controversial, which means others may argue about one's needs, for example if you say I want

to go to a maintenance company to discover computer problems and solutions, that is incontrovertible. While if you say I need to go to a maintenance company to write a paper about computer problems and solutions, some could say I do not think that you need to do so, rather you should read some journals articles to write your paper. In addition, need is linked to necessity, which means that in order to accomplish a certain goal, it should be preceded by the need. Case (2006, p 70) used the narcotics and addiction case to explain the relation between need and necessity, stating that “if I said to you that I needed narcotics, that sentence may be true in the sense that drugs are necessary to accomplish my goal – to satisfy my addiction”.

However, although need is linked to necessity, it is not always necessary to meet it, or even respond to it. For example in the Case situation, there is the potential to deny help in obtaining narcotics, which is the need, to satisfy the addiction. People might suggest that the addicted person needs to have medical treatment to solve the problem of addiction rather than fulfilling the need for narcotics to satisfy the addiction. Finally Green believes that need is not always a conscious “state of mind”, rather one might be unconscious of one’s exact needs.

2.2.1.1 Information demands

Regarding information demands, it is a requisition, which could be written or spoken, made to the information system for the purpose of acquiring information or information source (Brittain 1970). In other words, it means the interpretation, which is done to acquire the information, to satisfy recognised needs. Although information demand is totally different from information needs, and it may be the beginning of an information seeking stage, Brittain believes that demand could be equivalent to need when all pertinent information is known to the enquirer. Moreover, Green (1990) stresses that information demand is not only what people order, but it also encompasses the use of the information system services. In addition, Case (2006) argues that it is not as complicated to measure as information needs.

2.2.1.2 Information needs

With regard to information needs, Brittain (1970) claims that the term information needs is difficult to define precisely. What is more he claimed that it is not always practical to ask users to express their information needs. Brittain indicated that some of information needs studies instead were information demand studies. Wilson (2000b) attributed the difficulty of the term information need with the complexity and the different conceptions associated with the term information itself. He believes that confusion resulted from the failure to differentiate between alternative explanations rather than “the lack of a single concept”.

Nicholas (2000) believes that people do not possess the information need itself, but when problems are experienced or people are pressured by certain conditions, there is often a need for information for the purpose of completely or incompletely addressing such cases, and achieving their ultimate objective. This confirms Belkin and Vickery’s (1985) conclusion, who stated that recognising a gap in knowledge gives rise to information needs. The problems encountered by doctors in the context of their daily work, particularly, those that related to patient care for instance, could lead them to discover that the amount of information and knowledge in their mind is not enough to solve that problem, which in turn might make them recognize that there is a gap between what they already have and the external source of information that is available. Therefore, they ought to consult the experts and the information systems to acquire the needed information to fill that gap in their knowledge. Although Case (2006) has not expressed the idea of gap in knowledge explicitly, he defined information needs similarly as the acknowledgment of the inadequacy of your knowledge to fulfil your objectives.

Moreover, Nicholas (2000) and Wilson (2000b) argue that information needs emerge out of the aspiration to satisfy one of the essential human needs. Though information is not classified as a primary need as is the need for food or security for instance, according to Wilson (2000b) the need to be informed might be necessary to meet completely or partially the basic human needs. He showed that the three kinds of individual needs (physiological, emotional and cognitive) are

interconnected, and the person might involve all of these in information seeking behaviour so that he can satisfy needs.

However, to confront the complexity of discovering information needs, Line (1969) recommended that a needs study should encompass the study of use and demand. Moreover, Bailey et al. (2000) believed that knowing users' characteristics, that might have an effect on their information needs, such as their background in using information sources and the information systems they use or have access to and their work role and the related tasks (doctor, manager, clinician etc.), are required in user information needs investigations, to understand what information is probably required by them.

Information needs are therefore seen to be associated with satisfying fundamental needs. It is also associated with a gap in understanding and solving problems. What is more information needs can be expressed and identified through use and demand. However, many aspects of the user could affect their information needs including the work role and the related tasks in addition to their experience in using the information systems.

2.2.1.3 Information wants

In respect to information wants, Nicholas (2000) stated that information want is what is appreciated to be acquired. This means it could be an objective per se, instead of a means to accomplish or achieve other specific objectives, for instance people could want some information about a particular disease not to achieve a task or because they suffer with this disease, which means that their goal is to acquire information about that disease. Based on what has been mentioned above about information needs, it seems that information wants and information needs are similar in that both of them need to be articulated by the people. However, information wants differ from information needs. Green (1990) believes that it is possible to ask people about their wants, which is not the case with needs particularly if the people are not aware of their needs, and it is possible that people could want what they do not need. Furthermore, he thinks that wants could be

clearly inferred from the patterns of related behaviour. As a consequence, it is not necessarily what is wanted that indicates what is needed, and vice versa.

2.2.2 Information behaviour

According to Wilson (1999b) the interest in information behaviour can be dated back to the Royal Society Scientific Information Conference of 1948, where there were some papers that addressed the scholars' and technologists' information behaviour. Although information behaviour was not clearly mentioned, the notion obviously existed. This implies that the term had been used before using the term "information science" itself, which was coined in 1954 by Chris Hanson. Since the Royal Society Conference there has been a considerable amount of literature that addressed people's information needs and their information seeking behaviour. For example in Case's work (2006) over 1100 relevant titles were cited.

2.2.2.1 Information behaviour concept

Case (2006) believes that there has been less argument on the information seeking concept than about the concept of information need. Hence most of the studies carried out did not offer a definition of information seeking behaviour. However, subsequently some writers have provided a definition. Wilson (2000a, p 49) provided the following definition for the concept of information behaviour "Information Behaviour is the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use". Furthermore he differentiates between the information behaviour, information seeking behaviour and the information searching behaviour. According to him while the information seeking behaviour is the purposeful finding for information as a result of a need to fulfil some objectives using electronic or paper based systems, the information searching behaviour is the 'micro-level' of behaviour undertaken by the searcher to interact with information systems of all types.

Wilson (1999b, p251) suggested that "Information-seeking behaviour arises as a consequence of a need perceived by an information user, who, in order to

satisfy that need, makes demands upon formal or informal information sources or services, which result in success or failure to find relevant information". Wilson therefore emphasizes that the information seeking behaviour is a response to a need recognized by the user, which results in taking an action to fulfil this need.

Case (2006, p5) provided a definition: "Information behaviour encompasses information seeking as well as the totality of other unintentional or passive behaviour (such as glimpsing or encountering information), as well as purposive behaviours that do not involve seeking, such as actively avoiding information". With this definition Case believes that information behaviour is a "covering term" for a large body of information associated with the topic. In other words it is an umbrella or broad term that includes several topics, such as information needs, information seeking and information use.

The discussion above reveals the complexity associated with the topic, the terminology and the importance of clarifying terms in order to study this area precisely.

2.2.3 Information behaviour models

According to Ennis, Sutcliffe and Watkinson (1999, p96) previous empirical research drew attention to many variables that influenced the users' information seeking behaviour. For instance "the display of retrieved results can alter search strategies", "the information need type influences search behaviour" and "the task complexity, reflected in the information need can affect user's search behaviour". These critical variables are not as obvious as the term itself. Therefore, more accurate conceptual models and theories of information seeking behaviour are needed as a foundation to understand what is associated and influential in the information seeking behaviour. This in turn could lead to enhancement of the functionality and usability of information systems.

Models have been designed to work as conceptual frameworks that logically elucidate the different characteristics of the users' information behaviour in general, particularly, their information seeking and searching behaviour, and the

wide variety of variables that might affect it. However, Wilson (1999a) stated that there are not many models on general information behaviour, compared with the number of models on information seeking behaviour and the information searching behaviour. Wilson believes that the information behaviour model encompasses the information seeking behaviour models, which in turn include information searching behaviour models.

Johnson (1997) indicated that theoretical models of information seeking behaviour have to deal with three critical issues. First, models should provide a constant theoretical foundation to predict alterations in information seeking behaviour. Second, models should guide effective strategies for information seeking. Third, information seeking behaviour should be clearly conceptualized by models, and they should provide detailed descriptions of it.

Wilson (1999b, p 250) suggested that the model is “A framework for thinking about a problem and may evolve into a statement of the relationships among theoretical propositions”. Moreover, he described the models in the general field of information behaviour as “they are statements, often in the form of diagrams that attempt to describe an information-seeking activity, the causes and consequences of that activity, or the relationships among stages in information-seeking behaviour”.

Case (2006, p120) argues that the model in general is usually defined in relation to theory. Additionally, he pointed out that models are “usually more specific than theories, dealing with the particulars of a chosen context. In some cases, models may explicitly refer to one or more theories”.

The model in general results in, for example, a diagram or flow chart that represents and helps us perceive what we experience about phenomena, using interrelated categories that may overlap each other and it could include an indication of the driving force behind the phenomena to indicate what might have an influence on the phenomena.

As a result of the importance of conceptual models for the purpose of better understanding information seeking behaviour and the factors that affect it, there have been a number of attempts to develop generic models or conceptual frameworks e.g. (Savolainen 1995; Leckie, Pettigrew and Sylvain 1996 and Wilson 1999b).

2.2.4 Influential factors have been discussed in the previous models.

Many factors have been highlighted by the previous models that are believed to have an impact on the information seeking behaviour. These factors ranging from psychological factors to environmental factors as Hepworth (2004) classified them in his initial framework. The next paragraphs discuss in more details the factors that influence users' information seeking behaviour.

2.2.4.1 The work roles and related tasks factor

One of the important factors that might influence the information seeking behaviour is work roles and the related tasks. This factor has been discussed by some of the previous models, for instance Leckie, Pettigrew and Sylvain (1996) mentioned "work roles" and "tasks". Wilson (1999b) referred to the importance of "role-related", Nicholas (2000) mentioned "job" and "occupation" and Hepworth (2004) recognized the significance of "roles", "norms" and "tasks".

These models although they involve the work role and the associated norms and tasks, that professionals are assumed to undertake in their daily routine work, they are not concerned directly with the information seeking behaviour. There is however stress on the profound impact of this factor on the information needs. Previous authors believe that the work role e.g. services provider (doctors managing patient cases), administrator/manager (doctors involved in managerial works), researcher, educator, or student (doctors involved in, for instance Continuing Medical Education programme (CME)) and the associated tasks, such as assessment, counselling, supervising or report writing, give rise to specific information needs which in turn might prompt the information seeking. Bryant (2004) indicated that the remarkable difference between doctors in training and doctors from non training practices was due to the work role of the trainers driving

their information needs. On the other hand the non trainer doctors stressed personal curiosity as a driving force for seeking information.

The norms relating to the work place may also affect the information seeking behaviour. Certain roles may be associated with norms that discourage information seeking. For instance in a hierarchical society there may be situations whereby consultants or older and senior people in general do not want to ask junior staff. Furthermore, they may not want to admit that they do not know some thing (for example how to use electronic resources) because they are afraid of looking ignorant or they are afraid of losing their reputation. Although studies do not provide categorical empirical data to support this, this may be a case of how norms and values may affect information seeking behaviour. Wilson (2006), in his discussion of the use of activity theory to explain information behaviour, emphasized the impact of rules and norms on the information seeking behaviour of users. The argument in this theory is that people within a community are controlled by rules and norms to a certain extent when involved in an activity generated by motives, which translate to certain work actions, to achieve their objectives and goals using artefacts and abstract instruments.

An example of the way the activity theory might be applied in the information behaviour of doctors is as follows. Doctors (community controlled by norms) are tasked to care for ill people, in the wider community (hospital controlled by rules) in certain conditions (rural or urban environments, sole or group practice and so forth) and as doctors are assigned cases (patients) to manage. The motive (stimulated by law) to provide health care, the object (depending on the task) is the patient to be diagnosed, and the goal is the patient to be treated. Doctors in order to accomplish their task are in need for information, therefore they engage in activity that consists of several actions to acquire the necessary information and knowledge. The action taken may be observing (any symptoms), listening (to patients and/or accompanying person), reading (patient history), reading (previous notes), and reading (the lab and radiology results). When doctors are uncertain they may consult and talk (with their colleagues) and/or search (the medical literature whether electronic or paper based). The mediating instruments may be artefacts (patient history, the lab and radiology results, colleagues and consultants

and medical literature whether electronic or paper based), or practical experience and/or the rules and norms within the community (Wilson, 2006).

However, Wilson (1999b) believes that the influence of the “intervening variables”, can be “supportive” or “preventive” on the information use, therefore, the term “intervening” has been used rather than barriers or obstacles. Nicholas (2000) too emphasizes that the implications of the nature of the job on information seeking can be de-motivating. For instance if the professionals undertake unsatisfying jobs and feel that they are unfairly treated, their commitment to work may not be good, and as a consequence they would be less keen to pursue seeking information in depth.

2.2.4.2 The psychological factor and the personality patterns

Another critical factor that has been pointed out by the previous models, is the psychological factor. This factor has been mentioned clearly by some writers, for instance Wilson (1999b) and Hepworth (2004). While Wilson (1999b) mentioned the psychological factor within five kinds of “intervening variables”, Hepworth (2004) suggested “psychological data” as a broad heading of data related to the psychic state. Hepworth reported that “knowledge state”, “cognitive state”, “style state” and “affective state” are subgroups and fall under this category. The psychological factor is seen as a temporary condition relating to a specific situation rather than persistent condition, therefore, the term “state” has been used for the subcategories in Hepworth’s model.

The authors believe that the psychological data such as the knowledge (both knowledge of subject and knowledge of information sources) or the cognitive state might give rise to specific information need which in turn may or may not lead to seeking information. For instance Wilson (1997) indicated that people tend to be uncomfortable when they experience knowledge conflict or when they are uncertain about a situation or topic, consequently, they might seek further information to eliminate or diminish the conflict and the uncertainty. Furthermore, it is thought that the knowledge state could have a direct and profound impact on the information seeking behaviour. MacInnis and Jaworski (1991) claimed that

highly knowledgeable people may find it easier to “encode” information; therefore, they might seek and acquire information more easily. Moreover, both Radecki, and Jaccard, (1995) argued that the deep or superficial seeker of information might be affected by the knowledge level about a topic. According to them the more knowledgeable the people the less likely they would do in-depth information seeking on what they are knowledgeable about. However, this would depend on their role, for instance doctors who are involved in research might do more in-depth information searching in a certain area than managers or clinical practitioners would do.

With respect to the impact of knowledge of information sources, there may be a situation where a person (doctor) is knowledgeable about his topic but has little information of the information sources and that may affect his information behaviour. Aaronson et al. (2001) and Lærum, Ellingsen and Faxvaag (2001) concluded that the poor skills might be an important reason behind the low utilization of the electronic medical records system (EMRS) by doctors. D’Alessandro, Kreiter, and Peterson (2004) noted that the use of the computer to find an answer to pediatricians’ clinical questions increased significantly after educational intervention. Such conclusions indicate the profound impact of knowledge of information resources on the information seeking behaviour, where people seem to use heavily the information sources that they are more confident to use than the sources they are less confident with.

Some personality characteristics such as people’s sense of self efficacy may give them the ability to expect the results that are associated with a particular action may have an influence on their information seeking behaviour. Wilson (1997) stated that the self efficacy as a generic concept can determine the information seeking behaviour. For instance, it is assumed that people may be conscious that using information sources can provide helpful information but uncertainty about accomplishing the necessary search or actions may influence their information behaviour and lead to failure to utilize the information source. The same is true if the expectation is that the information source cannot contribute to their knowledge and solve their problem, such expectation also would influence

their information behaviour. This may be how self efficacy may affect the information behaviour.

Nicholas (2000) stressed that other “personality” traits might have an influence on the users’ information behaviour, such as “receptiveness” which means the readiness to accept information from other people, “persistence” which means the readiness to continue seeking for information, “orderliness” which means to be organized and systematic in relation to the storage and retrieval of information, “thoroughness” which means the readiness to seek more detail, and “motivation”. The author stressed that such factors need to be considered when studying the users’ information behaviour.

2.2.4.3 The Demographic factors

Demographic factors, such as age, gender and education etc, have been identified by other authors including Wilson (1999b) and Nicholas (2000), as some of the factors that might have an impact on the users’ information behaviour. For instance Gruppen (1990) emphasized that doctors’ age had an impact on their preferences for information sources. The study found that younger doctors were more likely to utilize medical literature and their colleagues than did the older doctors. In addition, the study indicated that pharmaceutical representatives were more frequently used by the older doctors than their younger counterparts.

With regard to gender Casebeer et al. (2002) noticed that the local or in house continuing medical education (CME) meetings were seen to be less helpful for male doctors than for female doctors. With regard to the use of the Internet the study showed that female doctors were more likely to use the Internet to seek particular patient information. Bennett et al. (2004) reported that female physicians were less confident than male physicians in using the Internet to obtain medical information. What is more, the study noticed that the male physicians were more likely to use the internet on a daily basis than their female counterparts. Such outcomes give insights into the preferences of the users, which are worth considering when satisfying their information needs.

2.2.4.4 Factors related to the information sources

The characteristic of information sources is another factor that has been highlighted by the previous models as an intervening variable that might affect the user's information behaviour. For instance Leckie, Pettigrew and Sylvain (1996) noted the importance of "source of information" in their model, Wilson (1999b) mentioned "source characteristics" as a significant factor in his model, Nicholas (2000) mentioned "access" and "resources/cost" and Hepworth (2004) emphasized the impact of "source data".

The information sources discussed in the previous literature encompassed paper based sources e.g. books, journals, theses, and so on, electronic based sources e. g. databases and websites and personal sources such as colleagues, professional experts and librarians. The authors believed that the characteristics of these sources, such as the accessibility, availability, credibility and accuracy, may have a profound impact on the users' information behaviour. Wilson (1997) argued that information seeking behaviour might be restrained by the lack of straightforward access to the information sources. The importance of the accessibility of the personal sources has been emphasized. For instance, Urquhart et al. (2007) found that the readiness for seeking information of clinicians increased when the clinical librarian participated with a clinical group to seek information. Furthermore, the problem of the credibility and the accuracy (quality) of the information on the internet were emphasized by Boissin (2005) as reasons that limited the use of the internet in clinical practices.

It is therefore, clear that different factors have been recognized in the previous literature that are thought to have an influence on the users' information behaviour. These factors might be psychological variables, associated with the internal state of the person, or sociological variables related to the environment and the information sources. Additionally, the implication of these factors can be supportive or preventive to the users' information behaviour. The authors recommended that such factors should be considered in order to understand the users' information seeking behaviour.

2.3 Doctors' information behaviour

Doctors' information behaviour has captured the attention of a considerable number of researchers in many countries, particularly in North America and Europe. As a result of this interest many studies and reviews, (Westberg and Miller, 1999; Bryant, 2000; Coumou and Meijman, 2006; and Davies, 2007) have been conducted to investigate the different aspects of doctors' information behaviours, and their use of different types of information sources. Some of these studies attempted to investigate the attitude of doctors toward using information sources whether verbal or written, for example (Verhoeven, Boerma and Jong, 1995; Haug, 1997; and Dorsey and Detlefsen, 2005), or the use of specific information sources, particularly, the internet and electronic resources, (Torre et al, 2003; Boissin, 2005 and Meats et al, 2007).

Some studies focused on doctors' information needs; a case in point is Lappa (2005). Furthermore, Gorman (1995) suggested a framework to study doctors' information needs. Other researchers explored the different perspectives of information behaviour (information needs, information seeking and attitudes toward using library and the internet) of doctors, such as (Bryant, 2000 and Nail-Chiwetalu and Ratner, 2007). In addition, there have been studies that discuss the information needs and the information seeking behaviour of particular specialists of doctors, such as surgeons (Shelstad and Clevenger, 1996) or general pediatricians (D'Alessandro, Kreiter and Peterson, 2004), the majority of these studies focused on the primary care doctors or general practitioners (GPs), who in the USA are known as family doctors, (Boissin 2005; Dorsey and Detlefsen, 2005; Coumou and Meijman, 2006; McKibbon, Fridsma and Crowley, 2007 and Gonzalez-Gonzalez et al. 2007). Both qualitative and quantitative methods have been applied to study this area, and different data instruments have been utilized.

However, bearing in mind the discussion of the previous models particularly those that identified factors that might have a profound impact on the users' information behaviour, not all factors have been considered in the previous studies of doctors' information needs and their information seeking behaviour. Bowden, Kromer and Tobia 1994; Shelstad and Clevenger 1996; Forrest and Robbt 2000 and Gonzalez-Gonzalez et al. 2007, for example did not provide detailed

information about the influence of the work roles and the related tasks and norms on the information needs, even though some of them stated that the area of speciality was included as a question in their questionnaire.

Furthermore, these studies did not consider the impact of demographic factors (gender and age for instance) on doctors' information needs and their information seeking behaviour. For instance, Gorman, Yao and Seshadri (2004) did not provide in-depth analysis of the impact of gender and age on the information seeking behaviour of the doctors who participated in their study, though they collected such data to clarify the participants' characteristics. Similarly, D'Alessandro, Kreiter, and Peterson (2004) did not provide detailed information on the influence of the demographic factors and the work role on the doctors' information seeking behaviour, though the study discussed the impact of knowledge on the use of kinds of information sources, namely computer and digital libraries. However, this has not been the case with regard to information sources, where many investigations have considered the characteristics of information sources and their influence on doctors' information seeking behaviour. A case in point is Bowden, Kromer and Tobia (1994) who attempted to discover the different information seeking behaviour of the doctors with access to medical libraries and those without access to local libraries.

The absence of uniformity among these studies, especially with regard to terminology, methodology and the different settings, makes it difficult to compare these studies. In addition, the small sample size in some studies imposes restrictions on the generalization of their results (Haug, 1997; Gorman, Yao and Seshadri, 2004).

Despite these problems, there were a number of endeavours to develop a framework for understanding information seeking behaviour and the information needs of the doctors, a case in point is Gorman's work (1995).

Studies have, therefore, been conducted to investigate the various aspects of doctors' information behaviour, whether their information needs or the different forms of information sources they use in order to satisfy their information needs,

as well as the obstacles that inhibited them and led to unmet needs. In addition, the various reasons that give rise to the information needs and led to seeking further information have been discussed in these studies as well. The next sections discuss the doctors' information seeking behaviour and their use of the information resources based on these studies.

2.4 Doctors' information needs

It is assumed that the daily clinical practice of doctors gives rise to information needs, and doctors, in order to provide high quality care they need to develop and enhance their own knowledge by keeping abreast of the developments in their fields. Bryant (2004) suggested that the information needs are restricted to those needs that doctors know exist or are thought to exist. However, in order to fulfil their information needs doctors need to access the different information sources at the time of need. The developments in health informatics have led to information systems that are supposed to provide doctors with accurate, valuable, recent and relevant information in the course of their daily practice. But due to insufficient information about doctors' information needs, these systems have failed to satisfy doctors' information needs (Gonzalez-Gonzalez et al., 2007). Green, Ciampi and Ellis (2000) found that the inadequacy of the sources is one of the obstacles that has led to resident doctors not seeking information for their clinical questions. Similarly Ely et al. (2005) reported that, due to the inadequacy of the systems, the searched resources failed to answer 153 (26%) of doctors' questions.

Understanding doctors' information needs and their information resource preferences is likely to enhance information provision and the health information system as it is the driving force behind the information seeking. Many studies have been conducted to explore the information needs of general practitioners, for instance Strasser (1978); Bryant (2004) and Gonzalez- Gonzalez, et al. (2007). Other studies have focused on specialists' information needs, for instance Shelstad, and Clevenger (1996) who focused on general surgeons and D'Alessandro, Kreiter and Peterson (2004) who focused on general pediatricians. Some researchers have endeavoured to discover the information needs of doctors who work in rural areas, such as Strasser (1978) and Dee and Blazek (1993). However, these studies have pointed out that doctors have different types of information need and that it is important to investigate individual cases to fully understand the doctors' information needs and seeking behaviour.

2.4.1 Types of information needs

For the purpose of better understanding of doctors' information needs, Leckie, Pettigrew, and Sylvain (1996, p 181) proposed a framework to help explain the need for information. The suggested framework classifies the situation according to the tasks, which are "service provider, administrator/manager, researcher, educator, and student". Such classification may give insights to the different types of information needs. For instance the service provider (patient management in the case of doctors) requires information in reference to specific patient care, whereas the researcher, educator, and student may need information that it is general in nature.

While Leckie, Pettigrew, and Sylvain (1996, p 181) categorized the type of information required by doctors according to the situations that give rise to such needs, these needs can be classified into two main broad categories. The first category is the clinical information needs, and the second category is non-clinical information needs. Lundeen, Tenopir and Wermager (1994, p 199) mentioned such classification. They classified the information needs as "Those generated by a specific case or individual (diagnostic, referral, pharmaceutical needs, etc.) and those of a general nature (research reports, grant information, statistical data, policies, directives, etc.)". It is assumed, that the first type refers to clinical information needs as it is in reference to patient care, and the second type indicates non-clinical information needs as it may be for purposes other than patient care such as teaching, and managerial purposes. However, the authors did not provide detailed information about such information needs and they included several health professionals other than doctors so it is difficult to take them as representative of doctors' needs. Change (2004) however also reported that 91% of the questions posed by doctors were associated with clinical purposes and the rest were for managerial, education and teaching purposes confirming this broad distinction.

2.4.1.1 Clinical information needs

Clinical information needs in the context of patient care include basic information about a patient's medical history, diagnosis and treatment information.

Bowden, Kromer and Tobia (1994, p 193) provided more information about the kind of information. According to them they include “diagnosis”, “physical signs/symptoms”, “treatment”, “lab tests”, “drug information”, “referral” and “provide information to family”. Therefore, the clinical information needs are the kind of information that is likely to be needed with reference to patient care and to support the clinical decision making of doctors.

Different terminology has been utilized to indicate such information needs by different studies, such as diagnosis or prognosis (Bowden, Kromer and Tobia, 1994; Green, Ciampi, and Ellis, 2000 and Seol et al., 2004), treatment (Dee and Blazek, 1993 and Lappa, 2005), drug information (Verhoeven, Boerma and Jong, 1995 and Forrest and Robbt, 2000), therapy (Green, Ciampi, and Ellis, 2000 and Change, 2004) and epidemiology (Schwartz et al., 2003). Such a variety of different terminology makes it difficult to compare these studies, particularly when different terminology may indicate the same meaning, e.g. treatment, therapy and drug information. Furthermore, some studies use the different terminology in the same study. For instance Bowden, Kromer and Tobia, (1994) concluded that drug information and treatment were types of information needs that prompted doctors to use MEDLINE in the context of patient care. However, treatment is a broad heading that may encompass more than drug information.

However, despite the problems that faced studies in this area, there have been some attempts to overcome the critical issue of the differences in terminology. Gorman (1995, p 730) suggested a general framework to classify the type of information needed by the doctors. He divided it into five types “patient data, population statistics, medical knowledge, logistic information and social influences”.

Gorman reported that the patient data associated with the role and tasks of doctors can be obtained from the physical examination of the patient, his family or his friends, as well as it can be inferred from the medical records (paper or electronically based) and from the different diagnostic tests, such as the laboratory tests and the radiology examinations. This information indicates the importance of the work role as a factor that may impact on the information behaviour. Thompson

(1997) indicated that many of the studies that have been undertaken to investigate the doctors' information needs have ignored the patient data and concentrated on the medical questions that can be answered by general medical literature. However, Gorman (1995) believed that the access to patient data in a small setting is not as difficult as in large setting, where the patient data is collected and stored in different places. Therefore, studies that have been conducted in a small setting might suggest that doctors may not need a comprehensive system.

With regard to the "population statistics", which indicates collecting data about the population or patients, Gorman believes that it may be important in relation to disease. However, this may depend on the role and task the doctor is undertaking, for instance if the doctor's role is disease prevention. Furthermore, Gorman argues that doctors have used information to adjust their medical decisions based on the recent and local experience in the context of patient care. On the other hand, Lundeen, Tenopir and Wermager (1994) pointed out that only three out of sixty (5%) of the rural doctors who participated in their study, indicated a need for information about health statistics. According to this study the doctors needed information that was more applicable to the individual patients. However, Thompson (1997) emphasized that doctors need to be informed about the population trends for the purpose of providing precise diagnosis and appropriate preventive health recommendations.

Medical knowledge, according to Gorman, includes all kinds of medical information that may be applicable to all patients. Such information can be obtained from the literature published in the medical journals and medical text books and the other sources, whether paper or electronic. Seol et al (2004) argue that due to the rapid developments in the medical field doctors are in need of medical knowledge to refresh their knowledge and to keep abreast of developments in the medical field. This argument relates to the cognitive needs of doctors, which have been identified under the broad category 'psychological data' in the previous information seeking behaviour models. Swinglehurst (2005) believes that the daily generation of medical knowledge imposes a great challenge in terms of accessing the more accurate and relevant information.

With regard to logistic information, according to Gorman, this refers to the knowledge that explains the procedures that lead to completing the work i.e. work related processes and associated tasks. Gorman believes that such information is significant for patient care. Doctors may ask questions about which medicine is available at the hospital for specific conditions, what should be done to acquire a specific service, and who is the consultant on shift or on the "referral list" for today and so forth. Thompson (1997) pointed out that logistic information has received less attention in the studies of doctors' information needs, as it is more informal and can be acquired from the hospital office staff or colleagues. However, Gorman argues that it must be accessed through the health information system. Therefore, it should be considered in a study of the doctors' information needs. This confirms the importance of the work role and the associated tasks discussed in the previous information seeking behaviour models where the different tasks may result in and drive different information needs.

Social Influences refers to "knowledge about the expectations and beliefs of others, especially peers such as colleagues and consultants, but also including patients, families, and others in the community" (Gorman, 1995, p 731). Hence the norms and normative values in the social and work context are important. Gorman argues that such information may have an effect on the doctors' information behaviour, for instance different patterns of prescribing a medicine. Similarly to logistic information, the social influences have been ignored in studies of doctors' information needs.

It appears that Gorman's classification encompassed a wide range of information that might be needed by doctors in the context of patient care. Furthermore, this classification has indicated possible resources for obtaining such information. However, there are other types of information that should be considered that give further insights into clinical information and needs per se.

Change (2004), in a study of clinical questions posed by hospital clinicians, categorized the doctors' information needs according to the pattern of the clinical questions, and whether they were "background" (questions about generic information related to diseases or particular states) and "foreground" (questions

about specific information in reference to a specific patient care e.g. diagnosis and treatment).

Taylor (1967, p 8) in his report ‘Question-negotiation and information seeking in libraries’ classified needs into two main types, where “there is the conscious and unconscious need for information not existing in the remembered experience of the inquirer”. As with Gorman (1995) he noted that, although information being studied is usually defined explicitly, the type of need remained indeterminate. As a result this is one of the significant problems in terms of generalising and comparing studies of doctors’ information needs that are used in the course of patient care. Gorman (1995, p 732) classified the kinds of needs into four types, “Unrecognized needs, recognised needs, pursued needs and satisfied needs”. Although Gorman provided four types of needs, his classification is in fact similar to Taylor’s 1967 classification, the last two types (pursued needs and satisfied needs) can be considered as a state of the need in terms of whether it is pursued or not and whether the pursued need has been satisfied or not, rather than type of needs.

2.4.1.2 Non-Clinical information needs

Doctors have a wide range of information needs apart from clinical needs. This kind of information is more likely to be generated for purposes other than the patient care, such as education and management. However, the majority of the research has concentrated on the clinical information needs (Owens and Tomlin, 1998 and Davies, 2007).

Non-clinical information needs, such as information needed to achieve educational objectives can involve real practice with patient cases (the real practice of medical students in the hospital with the patient, which requires that doctors who are involved in such programme should collect important information on the patient, such information may result in patient care management, though the main aim is to collect information that is useful in the educational context). Gonzalez- Gonzalez et al. (2007) found that 13% of the questions that were generated by primary care doctors in the context of patient care were classified in

the non-clinical category. The non clinical information encompassed information about administrative issues 5.5%, educational matters 3.3%, legal issues 0.8% and ethics 2.0%. The authors indicated that some questions were asked for non clinical information but did not fit any other non clinical categories and these were 1.4%.

This result agrees with what was previously stated by Lundeen, Tenopir and Wermager (1994) who stated that there was less need for non-clinical information among doctors. However, in the case of doctors who have a teaching or managerial responsibility for instance, there is a greater need for such non-clinical information. Consequently it should be recognized by the health information systems and effort should be made to satisfy such needs for doctors.

2.4.2 Recognized and Unrecognized needs

It is assumed that doctors in their routine practices encounter many medical problems that should be solved, and in order to support and make a clinical decision in the context of patient care doctors sometimes are in need of further information. The critical point is that doctors ought to acknowledge when there is a need to seek further information rather than depending on their own knowledge, though it is usually difficult to perceive the lack of knowledge (Wyatt and Sullivan, 2005). Therefore, the recognized needs are those acknowledged and expressed by the doctors (Gorman, 1995). Although recognized needs are often considered as a major driving force for making a decision to seek information, both Taylor (1967) and Gorman (1995) believed that it may not influence the seeking of new information. Seol et al. (2004) concluded that the recognized needs can be articulated with relatively few questions.

Regarding unrecognized information needs it may mean that sometimes there is an important need for information, but it is not asserted explicitly. However, although it is important, Davies (2007) points out that the unrecognized information needs have been neglected by the majority of the studies that investigated doctors' information needs. It is difficult to investigate these unrecognized needs.

It appears that doctors' information needs vary and there have been some attempts to classify these needs. Two main types have been identified, the clinical information needs and the non-clinical information needs and these have been itemized to some extent. Some studies focused on categorizing the type of doctors' needs per se, i.e. the recognized needs and the non-recognized needs. Other studies attempted to classify the clinical information needs according to the pattern of the question, i.e. as foreground and background information needs. Other studies have considered the type of the situation (role) (service provider, administrator/manager, researcher, educator, and student) that give rise to the information needs, as another approach for information needs classification.

Such classifications create the opportunity for making comparisons between the different studies, which lead to a better understanding of the doctors' information needs. For example when the studies clearly mention the type of information (clinical or non-clinical) or the type of needs (recognized and unrecognized) and utilize the same terminology (therapy or treatment for example) such clarification can facilitate the comparisons between the different doctors, groups (general practitioners or specialists for instance) that have been investigated and make the generalization more applicable for the same settings. However, the lack of common terminology and focus make this difficult.

Due to the focus of the research, previous research concerning the rural and urban doctors' information needs has been covered separately and distinctions highlighted. In addition, more details are provided on specific information needs.

2.4.3 Rural and urban doctors' information needs and the situations that prompt such needs

Looking at and analysing the literature, broad categories of information needs and information seeking behaviour of rural and urban doctors can be identified. In fact the previous literature has not really shown that there is dramatic difference between rural and urban doctors. The researcher has therefore chosen to synthesise these works. The only difference seems to be from Gorman, Yao and Seshadri (2004) who found that there was a slight variation in information

needs between rural and non-rural clinicians. For instance the study found that urban clinicians more frequently required insurance information than do the rural clinicians. However, the difference between urban and rural doctors is clearer in terms of their information seeking behaviour than their information needs, which is shown later in the information seeking section.

The different studies that have been undertaken to investigate the doctors' information needs concluded that doctors have a wide range of information needs. Gruppen (1990) however reported that doctors are not consistent in their needs, which imposes challenges for investigating and fulfilling their different needs. Previous studies have identified the most important doctors' information needs. However, the order of these needs, which may reflect the importance of such doctors' information needs, may differ between the studies.

Information for the purpose of daily patient care management has been found to be one of the significant doctors' information needs (Strasser, 1978; Dee and Blazek, 1993; Shelstad and Clevenger, 1996; Bryant, 2004 and Gonzalez-Gonzalez et al. 2007). These studies have emphasized the importance of instant access to valuable and accurate answers for clinical questions in the context of patient care.

Lappa (2005) confirmed that 100% of the doctors in his study sought information to assist in making a decision about treatment in reference to specific patient care, 48% to the treatment given to patients with certain conditions, 12% to check that treatment provided was suitable. These outcomes indicate that one of the most significant situations or factors that give rise the information needs is patient care.

Bowden, Kromer and Tobia (1994) provided detailed information about the type of doctors' information needs in the context of patient care. They showed that 34.3% of the respondents need information about treatment, 27.6% articulated a need for information about diagnosis, 17.6% showed a need for information about drugs, 12.6% indicated a need for information about physical signs and symptoms, 11.5% stated a need for information about lab tests and only 1.8% of

the respondents showed a need for referral information. Pharmaceutical information has been recognized by some other previous studies (Strasser, 1978 as well as Bryant, 2004). Information about cancer has been identified by Strasser (1978). Meats et al. (2007) in a study aimed at investigating how clinicians (including other than doctors) concluded that the top twenty search terms were related to disease conditions or problems. Although they found fewer terms associated with diagnosis tests and treatment, disease terms may have been used to fulfil such information needs.

From these studies it can be seen that information that relates to patient care is crucial for doctors and has been identified by the early studies such as Strasser (1978) and Dee and Blazek (1993) and the more recent studies for example Bryant (2004) and Gonzalez- Gonzalez et al. (2007). What is more, these studies stress that sometimes this information is needed at the time of contact with the patient, for instance Andrews et al. (2005) found that 68% of the respondents in their study stated that they sought information at the time of patient management when the patient was waiting. However, it should be taken into account that the study encompassed different practitioners including nurse practitioners and doctor assistants. The significance of information relating to patient care is likely to be attributed, as indicated by Gorman (1999), to the essential and ultimate objective of the doctors which is to access information to solve the patient health problems, rather than just obtaining some more information.

However, other studies have suggested that direct patient care information is not the only doctors' clinical information need. Lundeen, Tenopir and Wermager (1994) showed that information on clinical trials was the top need for 55% of the doctors in their study. However, these variations may depend on the context within which the doctors work.

Another situation that contributes to doctors' information needs is the willingness to be up to date with the recent developments in the medical field. Lundeen, Tenopir and Wermager (1994) reported that approximately 26% of the doctors, who participated in their study, emphasized a need for information about current medical research. Similarly, Bowden, Kromer and Tobia (1994) and Bryant

(2004) have pointed out that general medical information about the developments and current and recent medical information in the field of specialization were a crucial information need for doctors who participated in their studies.

Education and research were other situations that give rise to doctors' information needs. Bowden, Kromer and Tobia (1994) found that undertaking research work is an important factor that has prompted doctors to seek information. Both Shelstad and Clevenger (1996) demonstrated that information for the purpose of continuing medical education was the second important need for the general surgeons in their study, where they found that 83% of surgeons polled in their study sought information for this purpose, and that indicated the importance of work role. Lappa (2005) pointed out that 8% of the doctors polled in his study sought information to help in teaching colleagues. Boisson (2005) argued that to improve the patient care services doctors not only need information to keep abreast of the developments in medicine, but also need to be prompted to recall forgotten information that they have learned in their previous studies.

Patients' and their families questions is another situation that gives rise to doctors' information needs. Lappa (2005) showed in his study that 12% doctors sought information to help inform the patient or their family. Similarly, Nail-Chiwetalu and Ratner (2007) reported that answering questions posed by patients and their family members was the second motive for seeking information, after patient data.

Based on the discussion above of the previous literature that involved rural doctors for instance Dee and Blazek, (1993); Lundeen, Tenopir and Wermager, (1994) and Shelstad and Clevenger, (1996) and urban doctors for example Bryant, (2004) and Gonzalez- Gonzalez et al., (2007), it appears that there is not a significant difference with regard to the information needs of doctors who work in rural areas and their counterparts in urban areas, though comparisons are difficult to make between previous studies owing to the differences in terminology, methodology and setting etc. This conclusion is consistent with the study of Gorman, Yao and Seshadri (2004) who found that there was a slight variation in information needs between rural and non-rural clinicians. For instance, the study

found that urban clinicians more frequently required insurance information than did the rural clinicians. The study suggested that such a difference can be attributed to the considerable diversity of insurance within urban areas and the importance of determining whether a lab test or therapy is covered by the health insurance of the patient. However, it should be taken into account that other professionals were included in the study such as nurse practitioners and doctors' assistants rather than just doctors.

Although the majority of the studies have explored the clinical information needs, they did not provide detailed information about such needs. For instance, the studies did not provide information about the impact of demographic factors or the field of specialisation on such needs. As well as in case of a need for drug information there is not enough information about whether it is for the purpose of identifying the most appropriate medicine and dosage for the patient or the side effects of the medicine. In addition, the studies did not show whether lab test information was for identifying the proper examination and the obstacles of applying a specific examination or to interpret the results of the examination. What is more, there are no comparisons for such information between the rural and urban doctors.

Such detailed information would be helpful to gain a full understanding of doctors' information needs. However, the final aim of the health system i.e. to provide high quality care for the patients, appears to be the driving force behind ranking information related to the patient care as the top need for the doctors whether they are specialists or general practitioners and whether they work in rural or urban areas.

2.5 Summary

Doctors' information needs have been explored by many studies, particularly in America and European countries. The previous studies have investigated the type of information needed and the type of needs per se. The different studies concluded that doctors have recognised needs, which means that doctors experience and articulate a need for information, as well as unrecognized needs, which may mean that doctors do not know that their knowledge is insufficient and they are in need of further information. Although unrecognized needs are important, they have not received as much coverage as the recognized needs due to the fact that they are not expressed by doctors, which make them difficult to investigate.

Doctors in general have clinical information needs as well as non-clinical information needs. It has been suggested that the clinical information needs of doctors may be classified as: patient data, general medical knowledge, population statistics and logistic data. The majority of studies have concentrated on exploring clinical information needs rather than comprehensively studying the full range of doctors' information needs and although the clinical information needs have been explored, detailed information about such needs is lacking.

The information needs for the different groups (general practitioners and specialists) in different settings (hospitals and small clinics) and different locations (rural and urban) have been investigated to some extent. However, although there are differences between the previous studies, it has been concluded that information for the purpose of daily patient care management or the patient data includes: (patient history, observed symptoms from physical examination and results of lab tests), diagnosis and pharmaceutical information, information on clinical trials, general medical information about the developments and current medical information in the field of specialization and information for the purpose of continuing medical education, are the most important doctors' information needs.

What is more, to provide high quality patient care and to provide patients' families with appropriate information as well as keeping abreast of the

developments in the medical field are thought to be the most significant factors that prompted doctors' information needs. In addition doctors need to refresh their knowledge.

2.6 Doctors' information seeking behaviour

2.6.1 Factors prompting information seeking

It seems that doctors in reference to clinical decision making usually depend on their own knowledge accumulated over the years of daily clinical practices. However, due to the rapid progress in the medical field (Wyatt and Sullivan, 2005) and the wide range of the clinical problems that doctors are likely to deal with (Thompson, 1997; and Wyatt and Sullivan, 2005), the doctors' accumulated knowledge is not always sufficient or adequate to answer all medical questions in reference to patient care (Thompson, 1997). Therefore, doctors need to refresh their memories and keep abreast of the developments in the medical fields for the purpose of their patient's benefit and their own benefit.

Knowing the factors that influence and stimulate information seeking could lead to enhanced information services (Gruppen 1990; Nail-Chiwetalu and Ratner 2007), information needs and what motivates doctors to seek and obtain information are one of the key areas that many researchers have tried to investigate (Dee and Blazek 1993; Shelstad and Clevenger 1996; Bryant, 2004; and Lappa 2005).

Bowden, Kromer and Tobia (1994) demonstrated that confirming an opinion is a significant reason for seeking information by doctors. Gorman and Helfand (1995) concluded that primary care doctors are motivated to seek answers for their clinical questions when they are sure that the answer can be obtained and whether it is easy or difficult to find and access the information. Moreover, they found that the possible effect of information on patient care is one of the influential factors that motivates them to seek answers for their clinical questions.

Bryant (2000) in a review aimed at highlighting the published works that have contributed significantly to a better understanding of information needs, behaviour and preference of family doctors, concluded that the doctors were stimulated to seek information by a combination of vocational tasks and personality traits.

Ramos, Linscheid and Schafer (2003) found that resident doctors were prompted to seek further information immediately if the information is urgent and

important for the patient health. Gorman, Yao and Seshadri (2004) concluded that doctors heavily used the more instantly accessible information resources.

2.6.2 Use of information sources

Supporting doctors to improve the health care services entails assisting them to use the different information sources in order to satisfy their information needs. One of the critical issues, particularly in the medical field, that can affect the information use and information seeking behaviour of doctors is the amount of available information in this field. Wyatt and Sullivan (2005) concluded that the amount of medical information doubles every 20 years. As a result of this rapid increase in the amount of medical information, doctors are unable to keep up to date with all the recent and related information that might be needed in the context of patient care. Hence, doctors need to develop and enhance their knowledge to keep abreast of the developments in their fields by using the different information sources.

As in other fields, there are many types of information sources that could help doctors to obtain needed information, whether to achieve professional or personal tasks. These sources might be formal (printed or electronic) or informal such as personal communications. Regardless of type it is important to determine the preferences of the doctors and the most frequently used sources, to help develop medical library systems since use is an indication of need. Although there are a wide variety of resources used by the doctors in seeking information, there are two main categories. The first one is the internal resources, which encompass the patients' records, diagnosis, different lab examination results, data on radiology examinations and colleagues. The second category comprises experts and mediators (librarians and medical experts), different paper based sources and multimedia resources (videocassettes, audiocassettes and microforms or digital resources). Both categories are discussed in the next sections.

2.6.2.1 Interpersonal contacts

Interpersonal contacts with colleagues, consulting medical experts, pharmaceutical representatives and intermediaries such as librarians are one source of information used by doctors to seek further information. Thompson (1997) concluded that personal contacts were particularly important for primary care doctors for acquiring knowledge in the context of routine patient care. McGettigan et al. (2001) showed that communicating with pharmaceutical representatives and hospital consultants are the most significant sources for information on new drugs. Ramos, Linscheid and Schafer (2003) showed heavy use of human resources by resident doctors to answer their clinical questions. Similarly, Nail-Chiwetalu and Ratner (2007), in a 16-question survey study conducted to assess the information-seeking abilities and needs of practising speech-language pathologists, demonstrated that personal communications tend to be used most often, since 164 out of 208 responses ranked it as the first important information source for them.

The tendency of doctors to use personal contacts, to obtain information to solve clinical problems and foster personal knowledge or to fill gaps in knowledge, have been attributed by Dee and Blazek (1993) to the immediacy, accuracy and reliability of the information. In addition Dawes and Sampson (2003, p 14) suggested that the conversing with colleagues and other medical experts may be attributed to “a psychological need for reassurance as well as the need for tacit knowledge, which usually embodies the experiential knowledge of another individual”. Tan et al. (2006) confirmed that doctors preferred to consult more knowledgeable colleagues and experts to acquire further information in the case of unfamiliar patient cases. According to Tan et al. and Dawes and Sampson, when doctors encounter a difficult patient case then consultation with colleagues and other experts may confirm their knowledge or may they need more appropriate information based on the previous experiences of their counterparts. These people may be able to provide additional explanations about the symptoms and diagnosis, as well as tests and the therapy associated with that particular case.

2.6.2.2 Paper resources

It appears that doctors in general use paper sources in order to answer medical questions that emerge during their clinical practices and for other purposes such as education and research. Strasser (1978) conducted an investigation of the information needs of practising doctors in north-eastern of New York State, and reported that the information systems in the medical libraries were used mainly by the practising doctors who were involved with research and education. Whereas Verhoeven, Boerma, and Jong (1995) reported that family doctors tend to consider their colleagues as a first source in the context of patient care and self study. However, they confirmed that family doctors, who were concerned with research or education, depended mainly on formal resources whether printed or electronic. Haug (1997) and Dawes and Sampson (2003) concluded that numerous studies have concentrated on doctors' preferences for information resources, and revealed that books and journals were the first sources of information for doctors, followed by consulting their colleagues which contradicts the views outlined above. McGettigan et al. (2001) indicated that therapeutics bulletins and medical journal articles were often used as significant sources for information on both old and new drugs, but pharmaceutical representatives and medical consultants tended to be more essential for information on new drugs.

Some studies have been undertaken to investigate whether the medical literature can answer the doctors' clinical questions and satisfy their information needs. In A study carried out by Gorman, Ash, Wykoff (1995) to discover whether clinical questions posed by the primary care doctors could be answered by the literature published in the medical journals showed that the medical journals can provide information to answer such questions. They collected a sample of the doctors' questions (sixty questions out of two hundred and ninety-five recorded questions were selected randomly) and with the help of librarians searched for answers to those questions and then asked doctors to evaluate these answers (the study received feedback for only forty-eight questions). They found that doctors said that the information found was relevant for twenty eight out of forty-eight (58%) of the questions, and doctors stated that they obtained a "clear answer" for twenty-two out of forty-eight (46%) of the questions. What is more, the

study indicated that the doctors believe that the acquired information might have influenced 40% of the patient cases. However, the authors believed that one of the limitations of these outcomes is that the librarians who searched the answers did not meet the doctors who asked the questions. This might have affected their efficacy at finding more appropriate and relevant sources. In addition, they think that the estimation of efficiency and relevance of the retrieved articles may have been affected by the long period between the time of asking these questions and receiving the answers.

Similarly Chambliss and Conley (1996) investigated whether it is possible to find answers to doctors' clinical questions that remained unanswered; in their study they searched answers in MEDLINE and textbooks for 84 unanswered questions. From MEDLINE and textbooks the study showed one to five references that they thought would provide answers and sent them back to the doctor who asked the question to judge how well the references answered the questions. The study showed that forty-five out of eighty-four (54%) of the questions were completely or nearly completely answered by the literature provided to the doctors (but the study did not provide more detailed information about the other thirty-nine questions or whether they were answered partially or remained unanswered). Twenty-nine out of eighty-four (35%) of the answers had a profound influence on the doctors' practice, and pointed out that textbooks accounted for 20% of the sources that provided answers, and MEDLINE 70%.

It appears that the difference between the study of Gorman, Ash, Wykoff (1995) and the study of Chambliss and Conley (1996), was not great. The first study indicated that doctors reported that they received a clear answer for 46% of the questions and in the second study doctors said that they obtained answers for 54% of the questions. The difference might be due to the nature of the questions, the search strategy used, or the number and the experience of the medical librarians who performed the search. In the first study there were seven medical librarians with experience ranging from five to twenty years whereas in the second study only two medical librarians were involved. Moreover, the second study used only forty-one textbooks from lists recommended for family practice residency libraries.

The previous studies show that although doctors consult their colleagues to acquire information for their clinical questions, the paper resources could have provided answers to approximately half the questions. However, these may need to be more accessible or perhaps doctors need more knowledge of available resources, more time or more support to access these sources.

2.6.2.3 Use of the Library

The medical library, where the medical literature is collected and organized in an accessible form for all the health care providers, particularly doctors, has been established to help enhance and develop the health care services. It is important to note that the traditional role of the library has been expanded in some cases. For instance, offering information literacy guidance and information sources education mainly for electronic services (Bailey et al. 2000) and the support of the clinical librarians during the ward rounds, where the medical librarian is a member of the medical team and works as a mediator to find and provide doctors with information to answer their clinical questions at the time of their clinical practice (Deshpande et al. 2003). Cuddy (2005) indicated that hospital libraries, in order to continue to exist, have to prove a real contribution to achieving the ultimate aim of the hospitals that they serve. Otherwise, if the hospital library's functions are inconsistent with the hospital's aim, they might be closed.

Hence a number of studies have been conducted to investigate the medical libraries' value and the role of clinical librarians in the medical practices. Both Urquhart and Hepworth (1996) in a study to investigate the impact of medical libraries in the UK on clinical decision making reported that 73% of the respondents stated that they could use some of the obtained information from the libraries of national health service (NHS) immediately, furthermore, the study suggested that the obtained information was believed to be of future use in clinical decision making. Cuddy (2005) in a study undertaken to explore the value of hospital libraries pointed out that the medical library can contribute to enhancing patient care. For instance, the study found that some articles were used to apply

changes in medication prescribing and monitoring specific drugs, in addition to knowing what medicine to use more to treat particular symptoms.

Similarly, Urquhart et al. (2007) investigated the information seeking behaviour of a clinical team (the majority were doctors) after introducing a clinical librarian service, and found that the willingness for seeking information between the doctors increased when the clinical librarian participated with the clinical group. Where the modal search duration at the beginning of the study was less than 10 minutes, at the end of the study the modal search duration was between 10 to 30 minutes. Moreover, the study observed that doctors were more likely to ask librarians to search for information for them. Therefore it appears that the information services of the medical libraries can influence the patient health, by prompting doctors to apply evidence based practice that may provide them with the appropriate information that could have an impact on their clinical decisions. However, the latter studies indicate that the library needs to go to the doctor.

However, the use of the medical library differs between doctors in the context of patient care. While some studies pointed out a heavy utilization of the medical library, other research demonstrated that the medical libraries were underused. Andrews et al. (2005) for example, reported that the access to the medical library was high, where 46% of practitioners stated that they have access to a hospital library and more than 55% said that they can access medical libraries through the internet. Furthermore, the study concluded that the medical library was heavily used by the respondents, as 28% of the respondents stated that they used a medical library frequently, 33% said they used it sometimes, 21% rarely, and 7% of the respondents replied that they never used the clinical library. However, the study did not indicate the reasons why some participants rarely or never used the medical library. It might be due to lack of access, as the study indicated that only 46% of the practitioners had access to medical library, or that the poor information seeking skills led to frustration and inhibited further use or hindered the use of remote libraries, and the study recommended further studies to investigate such barriers. It should also be taken into account that the study involved staff other than doctors.

Although medical libraries play a crucial role in supporting the evidence based practices instead of opinion based practice, other evidence has suggested low use of the medical library. Dee and Blazek (1993) found that the medical library did not play a role in the rural doctors' information seeking behaviour and some doctors rarely used it, despite access and awareness of the hospital library. Bryant (2004) indicated that the medical library was not utilized heavily by family doctors. What is more, the study suggested that the personal library collection was the preferred information source for them. Similarly, Doney, Barlow and West (2005) noted a low use of libraries by general practitioners in Nottingham and Rotherham, UK. The study, however, involved practice nurses and practice managers which may have affected the results.

Some studies attempted to investigate the reasons behind the low use of the medical library. Bailey et al. (2000) found that the doctors in their study did not perceive the benefit of accessing the information, and it was not considered as contributing to the clarification of a problem.

While Bailey et al. (2000) observed a misconception of doctors towards libraries: libraries were not considered as a potential source of solutions to problems, Deshpande et al. (2003) and Bryant (2004) noted a lack of recognition of the potential role of the medical librarians as experienced qualified mediators to conduct search. They concluded that the doctors who participated in their studies were not aware and were uncertain of the potential support that a clinical librarian could offer in the context of patient care.

Lappa (2005) found that approximately 43% of the emergency clinicians polled in his survey stated that they had not heard about the clinical librarian programme before, moreover a lack of time led to low utilization of the hospital library.

In addition to lack of the knowledge of the role of the medical library and the potential role of the librarian as a mediator of information provision, the facilities and the library position have also been identified as obstacles to using the medical libraries. Forrest and Robbt (2000, p 133) reported that doctors in training, polled

in their study, believed that “the best time to use the library is out of hours.” Bryant (2004) pointed out that “opening hours”, “distance” and “parking” were the factors that restrained the family doctors who participated in the study from utilising the local medical library.

It could be argued that, in addition to the lack of recognition of the pivotal role of the library in enhancing the health services, the facilities and the library position, a lack of required information searching skills may also be reasons that hindered the success of doctors in finding and retrieving the needed information, which in its turn could result in reluctance in using the library.

Some solutions were suggested to address the reluctance to use paper based and electronic library sources. One solution was asking professionally experienced information mediators, for instance librarians, to conduct the search for the doctors (Bryant, 2004). This method, which requires an explicit question to avoid misinterpretation, was first used in the 1970s (Coumou and Meijman, 2006) to enhance the level of care to patients by collecting information in reference to a particular patient case from the medical literature. Lappa (2005) confirmed that the medical librarians could play a significant role in Evidence Based Medicine (EBM), by referring doctors to the most appropriate evidence during their medical practice, which in turn would save their time and could help them to give more attention to clinical practice, while being more clinically efficient. Lappa revealed that 82.8% of the respondents believe that librarians could help them to search for information. Therefore, the role of the medical librarian to some extent has been developed as a result; from being supportive to an educator and a practical information professional who utilizes evidence as a foundation for patient care, where they read and synthesize information and provide a refined summary to be sent to the doctors.

It is evident that the contribution of a clinical librarian in the health care system could result in improving the doctors’ information searching skills. Monitoring and providing evidence to support practice could enhance the health services (D’Alessandro, Kreiter, and Peterson, 2004). Moreover, confidence in using medical libraries by doctors could be increased by knowing medical

librarians and delegating search to them or asking for their recommendations. However, this may require a change in current practice and norms.

2.6.2.4 Electronic resources and the Internet

Doctors have a continuing need for information to be up to date. What is more, the diversity of clinical problems from one patient to another tends to also require awareness of developments in the field. However, their attempt to access relevant and appropriate information can be hampered due to the ongoing successive developments in the field (Dee and Blazek 1993, Wyatt and Sullivan 2005). Similarly, Hall and Walton (2004) indicated that several studies showed that the “knowledge explosion” in the medical field could make it difficult for doctors to access the relevant information in time.

Information and communication technology (ICT) is increasingly acknowledged as a significant way to enhance the patient care services and support doctors’ information needs. It is supposed that ICT has provided an opportunity for exchanging experiences and transmitting information in all its forms between people wherever they are. The developments in information technology have resulted in different electronic information resources. Westberg and Miller (1999) argued that over the past years various medical computer applications have been designed to support doctors’ clinical practice, and they placed these applications into three categories. The first category is bibliographic and full text information retrieval systems, such as the MEDLINE and the different electronic journals. The second category is clinical decision support systems, such as UpToDate and the Cochrane database. The third category is the Electronic Medical Records Systems (EMRS), which are computer applications that have been launched to manage patients’ data, diagnosis and treatment notes and enable doctors to view the different lab test results. In addition to these electronic sources, there are the medical web sites on the Internet. It is presumed that such digital resources can contribute to more effective patient care and help in addressing the problem of information overflow and the lack of time that doctors encounter when searching for information. Therefore, it is suggested that doctors should move toward the intensive use of the electronic resources as they are

more time efficient (D'Alessandro, Kreiter, and Peterson, 2004). However, there are still issues of quantity and search expertise.

The next paragraphs discuss the use of different electronic resources and the Internet by doctors to obtain medical information, particularly in the context of patient care and the main obstacles that hinder such use.

2.6.2.5 Use of Electronic Medical Records (EMRs)

The potential benefit of the Electronic Medical Records (EMRs) or the Electronic Patient Records (EPRs), which have been established to support doctors' information needs in the course of patient care, has been observed in previous studies. Strasberg et al. (1998) for example in a survey to identify family doctors' needs of the Electronic Patient Records (EPRs), found that 67% of doctors indicated that the Electronic Patient Records systems would facilitate their work and 87% of doctors believed that it could contribute to improving the patient care services. Similarly Westberg and Miller (1999, p 10) believed that the Electronic Medical Record Systems (EMRs) could support more effective patient care where there is reliable and efficient storage and retrieval of patient data "ranging from clinician's orders to clinical textual reports (e.g., history and physical examination notes, progress notes, nursing notes, discharge summaries, radiology reports, and pathology reports)". Aaronson et al. (2001), in a questionnaire with open-ended questions about the perceived benefits of Electronic Medical Records, found that doctors indicated the ease and fast access to patients' data. Moreover, EMRs provide a list of patients' health problems and these could facilitate the retrieval of another doctor's patients' data.

Regarding the utilization of EMRS Lærum, Ellingsen and Faxvaag (2001), in a study conducted to compare the use of three electronic medical records systems by doctors in Norwegian hospitals, concluded that these systems were used mainly to read the patient data and doctors were satisfied with these systems. However, the study suggested that generally there was a low use of electronic medical records systems. The authors argued that paper based patient records were still used in Norwegian hospitals, therefore doctors had the option of whether

to use the electronic based records or not and chose paper. Moreover, although the computer skills of doctors scored highly (as the study assessed the computer literacy of the respondents by asking them some questions in relation to this issue and where the mean summed score was 72.2/100) in this study, the authors suggested that computer accessibility and computer skills might be one of the reasons behind the low use of these systems. They believed that specific training in the use of electronic medical records systems would be beneficial.

Aaronson et al. (2001) found that only twenty-four out of a hundred and seventy-three (14%) of residency programmes in their survey used the EMRs. The study concluded that the EMRs does not reduce doctors' time per consultation and it seems to have affected the communications between doctors and their patients in the examination room. Furthermore, the study demonstrated that respondents reported that their workload had increased because of the EMRS, due to having to enter all their notes into the system and they encountered problems when entering this data. The EMRs did not contribute to improving doctors' efficiency or decreasing the clinical errors. The authors suggested that the problem of utilizing such systems could be due to insufficient training; the capabilities of EMRs were not fully used and the current EMRs were not capable of achieving the functions for which they were created.

Loomis et al. (2002) investigated the potential differences between the EMRs users and non-users and showed that the non-users perceived that the EMRs was not as credible or protected as paper based records. They believed that EMRs was not likely to diminish the potential for making medical errors. Furthermore, the study indicated that EMRs are costly and underused particularly by rural family doctors and in the small practices or private practices. They suggested that the EMRs are more likely to be established in large hospitals that receive considerable funds and where the infrastructure is strong. However, the study concluded that both users and nonusers of EMRs are interested in EMRs that can bridge all doctors' practices, laboratories and radiography facilities.

Miller and Sim (2004), in a more detailed study, investigated the obstacles that hinder doctors from using the EMRs and demonstrated that EMRs were not

integrated with the other electronic clinical systems, particularly in the solo and small practices. In some practices they found that doctors were not able to display the electronic lab and radiology results from the EMRs and some doctors indicated that they could not display the hospital data. Such problems meant that doctors had to shift between the different systems which in turn affected the workflow and required extra time to enter the necessary data from the other systems. This led to doctors refusing to use these systems. The authors suggested that employing more integrated systems could contribute to decrease the switching between the different systems. Moreover, using templates (already designed forms) may quicken the process of entering external data. However, the study revealed that the EMRs are of increasing significance to many doctors.

The outcomes of the previous studies indicate that, despite the great benefits that might be provided by the EMRs, it seems that it is not as helpful for doctors as it is supposed to be. Many challenges were encountered utilizing these systems, these ranged from technical problems to financial and included doctors' attitudes towards the EMRs. However, specific training for doctors, more developed integrated systems, technical and financial support are the kind of the solutions that were suggested to improve and accelerate the acceptance of utilizing the EMRs, though there is no simple and easy solution to overcoming these problems.

2.6.2.6 Use of bibliographic and full text information retrieval systems and the Evidence Based Medicine databases (EBM)

Bibliographic and full text information retrieval systems whether online or CD-ROM based are believed to be significant resources for doctors' clinical information, particularly medical databases, such as MEDLINE and UpToDate. Short (1999), in a questionnaire survey about the use of CD-ROM by rural family doctors, showed that medical CD-ROMs (medical textbooks, drug information and journals on CDs) assisted the family doctors in improving patient care services. What is more, the study indicated that they helped them to keep abreast of developments in the medical field.

Koonce, Giuse and Todd (2004), in a study to investigate the use of Evidence Based Medicine (EBM) databases to answer clinical questions.

Concluded that the EBM databases frequently contribute to answering generic patient care management questions and less often answer the more complicated clinical questions. This suggests that in order for the EBM databases to be widely and optimally employed they need to be integrated with the other medical literature to overcome their weaknesses and support their effectiveness, since the study showed that some questions were answered using EBM databases and other medical literature.

In contrast, Ann and Fridsma (2006) concluded that databases, such as MEDLINE, UpToDate and Evidence Based Medicine Reviews were unlikely to provide precise and correct answers for the clinical questions of general practitioners. The study suggested that the failure to find a correct answer to the clinical questions may be due to the use of inappropriate search strategies, poor selection of resources or time pressure.

However, despite the promise of the electronic databases digital sources are underused, D'Alessandro et al. (1998) pointed out that thirty-one out of ninety-three (approximately 33%) of rural doctors who were surveyed in their study use the digital health science library.

2.6.2.7 Use of the Internet

Peters and Sikorski (1997) argued that utilizing the Internet web sites by doctors was beneficial and can be a helpful for searching medical information and exchanging information with colleagues. According to Cullen (2002) doctors are encouraged to use the internet as a rich source of medical information and in particular used it to log into medical electronic databases. In general previous studies have shown that internet use was popular and doctors had used it for different purposes (Cullen, 2002, Casebeer et al. 2002, Bennett et al. 2004, Dorsey and Detlefsen, 2005 and Nail-Chiwetalu and Ratner, 2007).

Cullen (2002) highlighted that a hundred and forty-three out of two hundred and ninety-four (48.6%) of the general practitioners polled in his survey reported that they used the internet to seek clinical information. What is more, the study

demonstrated that the internet was predominantly used to seek information about the rare diseases. Casebeer et al. (2002) demonstrated that obtaining information to solve patient problems was the main reason to search the Internet by the majority of doctors polled in their study. Bennett et al. (2004) highlighted that the majority of respondents often used the Internet to access the most recent research on specific subjects and to find the latest facts about the disease. In addition, they confirmed that doctors believed that the Internet was significant for patient care and used it to find information associated with a particular patient issue. However, they stressed that credibility and relevance were the most significant Internet characteristics that affect searching medical information on the Internet. Dorsey and Detlefsen (2005) found that the internet was the most frequent tool used by the doctors who were interviewed in their study to collect information for patient education. Nail-Chiwetalu and Ratner (2007) confirmed that the Internet was used by doctors to manage clinical problems in the course of patient care and it provided them with “clinical information”.

On the other hand, studies by Bryant (2004) and Boissin (2005) pointed out that paper resources and contacts with peers and colleagues were considered the main sources of information for doctors for patient care, though electronic resources and the internet have become omnipresent. Boissin showed that approximately 28% (nine out of thirty-two) used the Internet to find clinical information, and there was an indication that it was not easy to find reliable information. Boissin noted that some doctors said that they did not know what they could find on the World Wide Web; some mentioned that they did not need it, some articulated that they did not know how to use the computer. Boissin suggested that there was inappropriate support to get the most from this tool. Gonzalez- Gonzalez et al. (2007) also observed that the Internet was not used frequently to find answers for the doctors’ questions in reference to a specific patient care. The low use of the Internet in this case might be due to the lack of access, as the study reported that only thirty-one out of one hundred and twelve doctors had access to the Internet in their office. This indicates the importance of source accessibility for users’ information seeking behaviour.

2.6.3 Barriers hinder the use of information resources and internet

Despite the positive impact that the computer and electronic databases might have on the doctors' decision making, there appears to be many problems associated with using electronic resources for the purpose of Evidence Based Practice. Below are some of the main barriers:

2.6.3.1 The time barrier

Lack of time was a critical issue that affected doctors' use of electronic information sources. Thompson (1997) noted that owing to lack of time, the primary care doctors tended to consult their colleagues, who have more and better knowledge instead of spending time searching electronic resources. Both Dawes and Sampson (2003) in their systematic review of doctors' information seeking pointed out that lack of time was the major problem that hindered doctors seeking further information. Coumou (2006) stated through a literature review study, that primary care doctors rarely used electronic databases, due to the time consumed in seeking information from databases. What is more, Nail-Chiwetalu and Ratner, (2007) concluded that the respondents lacked the time even to consult paper-based literature.

2.6.3.2 Reliability and security problems

The problem of confidentiality was also mentioned by Loomis, et al. (2002) in their study of whether family doctors prefer using electronic medical records (EMRs) instead of paper records. They discovered that the doctors who do not use the EMRs think that it is not as secure and reliable as paper records. However, Karsh, Beasley and Hagenauer (2004) reported that family doctors who use EMRS think that their medical records are better than paper records, where they are more up to date and easily accessed. However, the problem of security and the reliability of information on the Internet was emphasized by Boissin (2005) as one of the reasons that limited the use of the internet in clinical practices.

2.6.3.3 The communication infrastructure and systems specifications

One of the major barriers that contributed to the limited use of the electronic sources was the communication infrastructure and the availability of the necessary equipment to access and use the digital resources. D'Alessandro et al. (1998) found that the access point and the location of the computers was one of the barriers of using the digital library by the rural doctors in Iowa State in the USA. Similarly Torre et al. (2003), in a study conducted in America, who investigated general practitioners' interests in special features of electronic publication stated that the respondents tended to access medical texts and websites related to health issues, but the lack of the ability to login anywhere was seen to be a critical obstacle by the majority. The authors believe that developed computer access and speed (computers and online communications) can make the online journal and databases a good source for information in the field.

Forrest and Robbt (2000) showed that the dissimilar computer software deployed by the NHS hospitals was felt to be a critical issue raised by doctors in training in Oxford in the United Kingdom. The problem of different software had led to another barrier to using computer applications by doctors. Loomis et al. (2002) investigated possible differences in attitudes and beliefs about Electronic Medical Records System (EMRS) between current EMRS users and non users and found that data entry to current EMRS is not easy for either users and nonusers, as doctors in order to have a comprehensive record needed to enter a considerable amount of data from different systems, a case in point is electronic lab results, using different forms.

2.6.4 The difference between rural and urban doctors' information seeking behaviour.

Previous literature has not shown that there is any dramatic difference, however, there is an indication that there is some slight difference. Gorman, Yao and Seshadri (2004) investigated the similarities and differences between rural and urban doctors, in terms of their information needs, their access to information resources and their information seeking behaviour and concluded that the resemblances preponderated. The study showed that both rural and urban doctors depend mainly on local and instantly accessible information resources. With regard to human sources the study pointed out that both rural and urban doctors more often acquire information from the medical consultant, though rural doctors had less instant access. Furthermore, the study found that both urban and rural doctors infrequently used libraries and electronic resources, taking into account the difference in access ability, where rural doctors have less access to such resources than their urban counterparts.

However, the study indicated that there was a statistically significant difference in using information resources to answer rural and urban doctors' questions. The study reported that urban doctors usually used one or a maximum two information sources with an average of ten to fifteen minutes consulting these resources to find answers for their questions. On the other hand, rural doctors usually used more than two resources to answer their questions and spent a longer time doing this than their urban counterparts. However, it is not clear whether the differences were due to the nature of the questions or due to the different access to the information sources.

Moore-West et al. (1984) concluded that rural doctors more often required assistance to answer questions in reference to patient care, and less often sought information to answer questions to satisfy curiosity or for the purpose of research. However, the writers did not provide detailed information that indicated the reasons for that. But one can suggest that isolation may stimulate doctors to think that there might be new information that can help with managing a specific case or that due to the isolation and time pressure they were rarely involved in a research work.

Casebeer et al. (2002) indicated that doctors in rural areas are less likely to use the internet frequently, and they are less likely to use it to seek medical information. However, the study showed that doctors in rural areas are more likely to find information on the internet, more confident with their searching skills and more likely to use the information they obtained from the Internet.

2.6.5 Factors that affect doctors' preferences of utilizing information sources

The previous studies have attempted to identify the influential factors that affected the preferences of doctors for information sources. In an early study aimed at reviewing doctors' information seeking behaviour, Gruppen (1990) concluded that the first factor that affected doctors' preferences is practice characteristics (the society, size and kind of practice). For instance, doctors in an institutional practice (where there is full time hospital staff) more often consult colleagues than do doctors in solo or group practices, and this seems to be due to the fact that colleagues are more available in such practices than in solo practice. McGettigan et al. (2001) showed that there was a significant difference between general practitioners and hospital doctors. Hospital doctors 29% used their colleagues as a source of prescribing information, whereas for GPs it was 7%. The difference was probably due to the availability of colleagues in hospitals compared to those in a GP practice.

Gruppen (ibid) also mentioned that the availability of experts and personal characteristics were essential, such as age, where younger doctors were more likely to use medical literature and consult their colleagues than older doctors who often used pharmaceutical representatives. Experience and the field of practice also appeared to have an impact on doctors' preferences for using information sources. For example while D'Alessandro, Kreiter and Peterson (2004) reported that pediatricians more often used computer and electronic libraries to answer their questions, Gorman, Yao and Seshadri (2004) concluded that primary care doctors in rural and non rural areas more often used their colleagues and the available paper sources to answer their questions. Such differences may indicate

the impact of field of specialization on doctors' preference or the accessibility of electronic sources.

Lockyer et al. (1985) found that younger doctors seem to use medical literature more than older doctors. This seems to be affected by their experience and knowledge, where junior doctors have less experience than the senior doctors. However, Gruppen (1990) suggested that the difference in access and familiarity with using the information sources were more likely to be the reasons behind such differences between the younger and older doctors. One can add that younger doctors may be more technically literate which may help them use the electronic medical literature.

Haug (1997) and Casebeer et al. (2002) concluded that doctors choose the information sources that are most readily available, easy to use and provide more accurate and reliable information. Tan et al. (2006) pointed out that inter-personal contacts were preferred by cancer clinicians (the study involved doctors, nurses and pharmacists) when there is an urgent need for information or with unknown clinical cases.

However, Coumou (2006) reported that primary care doctors consider that the effectiveness and strength of information regarding a clinical problem are more important in decision making than the format of information.

2.6.6 Summary

Doctors satisfy their information needs by using both formal information resources, such as books, journal articles, electronic databases, etc. and informal resources, for instance, medical experts, pharmaceutical representatives, and librarians. However, doctors were not always aware of the role that medical librarians could serve in finding relevant information. Moreover, in some cases they did not perceive that the medical library could provide them with essential information that might affect the patient care services. Furthermore, previous studies showed that between urban and rural doctors the similarities outweighed the differences in terms of the use of the different information sources.

However, there is an indication that there was some slight difference. For instance, rural doctors used more than two sources to answer their clinical questions; they rarely sought information to answer questions to satisfy curiosity or for the purpose of research. In general, rural doctors used the internet infrequently and were less likely to use it to find medical information. However, rural doctors were more likely to find and use information from the Internet. Furthermore they were more confident with their information skills.

Previous studies showed that doctors encounter problems when searching some sources, particularly the Internet and electronic resources. For instance lack of time, the communications' infrastructure and systems specifications, and doubts about the reliability and credibility of information were all barriers. What is more, some of the doctors do not have a clear understanding of the benefit that might be obtained from using some of the information resources, namely medical libraries and librarians, in the context of patient care and medical decision making.

It appears that doctors' preferences for using information sources is affected by other factors such as practice characteristics, the personal characteristics and the field of practice. Moreover, it is evident that the availability and ease of access to information affect their information source preferences.

The previous studies showed that the feeling that information exists and its importance to the patient health are the most significant factors that prompted their information seeking.

2.7 Information skills

The acceleration of progress in the medical areas makes it essential for the health service providers to be informed of the developments in the medical field. Moreover, doctors in order to provide high quality care are encouraged and need to be involved in Evidence Based Practice, which is based on utilizing recent and authentic evidence to support the medical decision (Deshpande et al., 2003).

Therefore, it is crucial for doctors to be able to recognize what information they need and when, find, access, evaluate, and use information efficiently and effectively. Acquiring the necessary skills to do this is vital. Information literacy skills should enable them to manage content and provide them with the confidence to proceed with research, to be independent and have a sense of being abreast of developments, which should lead to better decisions and result in higher quality patient care.

However, the literature has reported that doctors' information literacy in general was one of the barriers that affected their use of electronic sources (Deshpande et al., 2003, Torre et al., 2003, Bryant, 2004, Dorsey and Detlefsen, 2005 and Coumou, 2006). These studies stressed that low computer skills was one of the barriers that doctors encountered when using databases. Torre et al. (2003) highlighted that three quarters of the respondents in their study did not use electronic journals, due to the fact that their computer efficiency was imperfect. Bryant (2004) and Dorsey and Detlefsen (2005) concluded that primary care doctors were dissatisfied with their skills of searching electronic media.

Meats, et al. (2007) indicated that primary care doctors encounter difficulties in formulating proper search strategies; hence the majority restricted their use to a single term to describe the clinical condition. They showed that five hundred and forty-four out of six hundred and twenty, approximately (88%) of search processes did not use Boolean operators.

Ely, et al. (2002) identified many barriers which hindered doctors answering clinical questions. Time spent in searching for the answer was the main obstacle

to pursuing clinical questions. D'Alessandro, Kreiter, and Peterson (2004) indicated in their study that overall, general pediatricians spent 14.4 minutes seeking an answer for each question. To show the impact of information skills on the time issue in their study, they pointed out that there was a considerable difference in the time consumed in searching for answers to clinical questions between a sample of pediatricians who have an educational intervention and another sample without intervention. They found that while the intervention group spent an average 8.3 minutes, the other group spent 19.6 minutes. What is more they concluded that the obtained information influenced patient care 71.8% of the time. In addition to that, the study demonstrated that doctors in both groups indicated a higher use of the paper resources compared to the electronic resources. However, the study found that the use of the computer increased significantly after the intervention. These outcomes are consistent with the conclusion of Gorman, Yao and Seshadri (2004) taking into account that the study encompassed practitioner nurses.

The issue of information overload defined by Bawden, Holtham and Courtney (1999, p 249) "occurs when information received becomes a hindrance rather than a help when the information is potentially useful". Information overload has been recognized as a problem that hindered using particularly electronic information resources, as doctors soon became overwhelmed with a considerable amount of information retrieved (Bennett et al. 2004; Hall and Walton 2004 and Davies 2007). Information overload made it difficult for doctors to identify the most relevant information at the time of need. However it is clear that although there is a considerable amount of medical literature, poor information skills may lead to irrelevant information.

Therefore, the results of the previous studies suggest that doctors need to develop their information skills in order to effectively and efficiently utilize Evidence Based Medicine databases and electronic medical resources.

One of the solutions suggested to counter such issues is training programme (Bryant 2004 and Booth 2007). D'Alessandro, Kreiter and Peterson (2004) in an empirical study aimed to characterize the information seeking behaviour of

general paediatricians, compared the use of computers and digital libraries before and after an educational intervention. They found that there was a reasonable increase in the use of digital libraries, and the time consumed in searching for information to answer their questions decreased after the intervention. However, it was important that the doctors' information needs should be considered in the training programme. For instance including actual information needs of the trainee doctors and showing them how to perform effective search strategies to retrieve information was successful. However, an imperfect training programme that did not relate training to needs was a barrier to doctors using an electronic medical library (D'Alessandro et al. , 1998).

2.8 Conclusion

The literature reviewed in this work showed that doctors have their own information needs in reference to their routine daily practice. It has been shown that doctors have clinical and non-clinical information needs. Generally, the most identifiable needs are the expressed needs, though doctors may have other important information needs, which are not identified due to the fact that they are not aware of those needs. Based on the previous literature it can be concluded that information for the purpose of daily patient care management or the patient data includes: (patient history, observed symptoms from physical examination and results of lab tests), diagnosis and pharmaceutical information, information on clinical trials, general medical information about the developments and current medical information in the field of specialization and information for the purpose of continuing medical education, are the most important doctors' information needs.

Furthermore, doctors' information needs arise as result of different reasons, such as to answer questions in reference to patient care, to provide patients' families with appropriate information and to keep abreast of the developments in the medical field.

It appears that from the literature, doctors' information needs motivate them to seek information. However, the information seeking behaviour seems to be influenced by several factors including:

Sociological factors:

- Work roles.
- Tasks.
- Norms.

Psychological factors:

- The knowledge state (includes knowledge of subject and knowledge of information sources).
- The cognitive state.
- The affective state.

Personality patterns:

- Receptiveness.
- Persistence.

- Orderliness.
- Thoroughness.
- Motivation.
- Self efficacy.

Demographic factors:

- Age.
- Gender.

The information sources characteristics

- Availability and accessibility.
- Credibility and accuracy.
- The ease of use.

It has been shown that information sources used by doctors in order to satisfy their information needs tend to be a combination of formal and informal sources. For instance, they use interpersonal contacts with colleagues and experts in the medical field. Both hospital and their own libraries were also used, as well as paper and electronically based information resources. Although they use a combination of these information sources, personal contacts and paper resources are still utilized more heavily than the digital resources.

Although it is assumed that the computers have a positive impact on accessing information readily quickly, doctors still encounter many problems in the course of seeking information. The most important reasons were the lack of time to search different databases, imperfect information searching skills, and a lack of an appropriate communication infrastructure for the digital resources and similar software. As a result of imperfect information searching skills doctors could be overwhelmed with irrelevant information when they undertook literature searching, which in turn could hinder their attempts to access the most relevant sources at the right time.

The literature demonstrated that doctors need readily accessible computers with Internet access; training programmes to develop their information skills and straightforward guidelines to signpost them at the different stages of their

information seeking. In addition to that, doctors have the willingness to delegate the literature searching to mediators particularly librarians when the librarians showed their ability to contribute in developing and providing high quality health care services, by seeking and evaluating a variety of information, then providing synthesised conclusions to answer the doctors' medical questions.

Generally, the literature reviewed showed that a better understanding of doctors' information needs, their information seeking behaviour and identifying the main obstacles that hamper their literature searching could help them with the Evidence Based Practice by resolving the barriers to information access and use.

2.9 Summary

The literature review showed that the most identifiable doctors' needs are the expressed needs, though doctors may have other important information needs. Based on the previous literature it can be concluded that information for the purpose of daily patient care management or the patient data includes: (patient history, observed symptoms from physical examination and results of lab tests), diagnosis and pharmaceutical information, information on clinical trials, general medical information about the developments and current medical information in the field of specialization and information for the purpose of continuing medical education, are the most important doctors' information needs. Furthermore, doctors' information needs arise as result of different reasons, such as to answer questions in reference to patient care, to provide patients' families with appropriate information and to keep abreast of the developments in the medical field. Also it has been shown that doctors use their own libraries and the hospital library more than the other channels. In addition they use a combination of formal and informal information sources to satisfy their needs, such as colleagues and books and they tend to use paper based sources more than digital sources.

Chapter three The Methodology

3.1 Introduction

This chapter provides detailed information about the focus and the research process of this study. However before discussing the research focus and its process, it is appropriate to discuss the research philosophy that guides the research process; defines the research per se; identify the type and purpose of research; provide a general overview of research methodologies research methods and the different techniques or instruments that can be used to collect data; after that introducing the different methodologies, methods and data collection techniques that have been used in the previous studies.

3.2 Research philosophy

It is believed that research attempts to understand the world; however it is important to notice the claim that the nature of problems that are addressed by social and human science differs from the nature of the problem that is addressed by the natural sciences. As the first deals with people and the latter deals with material, this means that the world is perceived differently. Therefore it is important for the researcher to know how best the world can be understood. This question has been a debatable subject between scientists for a long time. Three major philosophical schools about how the world is perceived, and how best it can be understood is discussed in the following paragraphs.

3.2.1 Positivism/Empiricism

Positivism, which was founded by French philosopher August Comet (Walliman 2006, p. 23), is a philosophical school that believes that all knowledge is based on empiricism (empirical evidence). Positivism looks at science as an approach to access truth in order to anticipate and control the world (Trochim 2006). It aims to apply the same research techniques of natural science to study a social phenomenon It is believed that a social phenomenon consists of “objective facts” that researchers can “measure” and apply “statistics” to come up with cause and effect relationship (Neuman 2007, p. 42). Positivists believe that knowledge should be proved according to direct scientific observations and physical justifications to reach the truth. Tashakkori and Teddlie (1998, p. 7) mentioned that

positivist philosophy consists of deduction (knowledge) derived from solely observation. Grbich (2007, p. 4) emphasises that positivists stress that truth exists only in what can be seen with eye. Pickard (2007, p. 6-9) confirms that positivist thinking focuses on addressing only what can be observed and measured. In addition Pickard (2007, p. 8) mentioned that positivists reject the notion that social phenomena cannot be investigated as “natural objects”. They believe that social phenomena can be investigated as a group of factors that can be empirically examined to decide any “evidence or causal linkage”. According to this philosophy what is not tangible has no meaning, and what has no meaning (can be validated or refuted by evidence), is not true.

The main principles of positivist philosophy are that knowledge is static (with single reality) and absolute; therefore it refutes metaphysics as a tool of knowledge, due to the fact that it does not have the meaning of certainty (right or wrong) (Tashakkori and Teddlie 1998, p. 7; Walliman 2006, p. 19; Grbich 2007, p. 4-7 and Pickard 2007, p. 6-10). A positivist believes that a researcher can be objective, as the researcher and the phenomena under investigation are totally separated, so the researcher can establish the absolute truth rather than relative truth (social phenomena have one reality) and without influencing the findings. This is due to the belief that the world works in a mechanical way and is operated by natural law (Trochim (ibid) and Pickard 2007, p. 8-9). Deductive reasoning, which accesses the truth by considering known facts, is the ideal reasoning approach for positivism, however inductive reasoning can also be used by positivists (Neuman 2007, p. 42-43). Although scientific experiment methods (by direct observation and measurement) are the ideal technique of investigation, survey and quantitative techniques can be applied.

3.2.2 Postpositivism

However due to the increasing criticism of the principles of positivist philosophy particularly regarding the claim to deterministic or absolute knowledge and the distance between known and knower, postpositivism has developed. Many writers (Tashakkori and Teddlie 1998, p. 7 and Pickard 2007, p. 9) believe that postpositivism is a developed version of positivism, and was a response to the

failure of positivism to change as a result of the emerging shift in the principles of the natural science. A postpositivist believes that although social reality exists, researchers cannot be absolute about this reality when they study human behaviour. Moreover, although “cause and effect” correlation is found, it is not often likely to know this connection entirely. Postpositivists believe that research can be affected by researchers as they cannot be entirely separated and objective during the study process. The research process starts with a theory in order to make a claim, however the postpositivist believes that both quantitative and qualitative approaches can be applied. Generalization is an aim for postpositivism as with positivism.

3.2.3 Interpretivism

Interpretivist philosophy is the opposite of positivist philosophy. The interpretivist believes that our knowledge of world is constructed throughout the life experience of people and their interaction with the world. Therefore social phenomena are in “constant state of revision” (Bryman 2004, p. 17). An interpretivist believes that human behaviour and social phenomena are very different from natural objects. It is a tenet of the interpretivist that people (researchers) and social reality are not separable, by way of contrast a positivist believes in dualism -people and social reality are separable- (Creswell 2003, p. 8-9 and Pickard 2007, p. 12). Neuman (2007, p 43) and Pickard (2007, p. 12) demonstrated that an interpretivist thinks that social life is based on beliefs and ideas rather than “objective reality” as well as the social reality is “constructed, holistic” and multiple. Bryman (2004, p 17) reported that a social researcher demonstrates a “specific version of social reality”, due to beliefs that “the view of the world that we see around us is the creation of the mind” (Walliman 2006, p. 20). Thus it is difficult that social researchers just utilize natural science research techniques to examine human behaviour and social phenomena.

For the purposes of this study a postpositivism approach is chosen as the philosophy that guides this research process. The main reasons for choosing this philosophy is that both a qualitative and quantitative approach can be applied, in

addition it helps to achieve the aim of the study to come to the true reality that can be generalized without the researcher's influence.

3.3 A definition of research

Although Hernon (1991, p. 3-4) indicated that it is not easy to find a widely accepted definition for research, he provided a definition that may cover all kinds of research in the Library and Information Science field. He believes that "Research is an inquiry process that has clearly defined parameters and has as its aim the:
Discovery or creation of knowledge, or theory building;
Testing, confirmation, revision, refutation of knowledge and theory; and/or
Investigation of a problem for local decision making."

According to the author the "inquiry process" is comprised of different stages. The first stage starts with a definition of the research problem, which involves a literature review to build up the theoretical framework and then the conceptual framework of the research. Pickard (2007, p. 40) indicated that "theoretical framework covers the theories, concepts and issues which surrounded your chosen topic… when you move from theory to concepts you begin to identify the true focus of your research". Furthermore the "inquiry process" includes the stage of adopting proper research methodology, methods and techniques. After identifying the theoretical and conceptual framework, the data collection stage starts. Followed by data analysis and finally presenting the research outcomes and providing recommendations for further research.

It can be argued that this is an entire definition of research in general as it encompasses a variety of research purposes as well as the different stages of the research process. Therefore, it is applicable to library and information science research.

3.4 Type of research

Based on the aim of the research and the concentration of the researcher (whether to develop and build up knowledge or to participate in solving a particular instant problem) in general, there are two types of research in general:

Basic research;
Applied research (Hernon 1991 and Neuman 2007).

Basic research is that kind of research that is concerned with pursuing knowledge per se. It may or may not instantly strengthen and add to the fundamental base of knowledge. The purpose of basic research is to generate new theories or establish new generalisations by adjusting surviving theories (Hernon 1991).

On the other hand, applied research is concerned with either validating theory, which may lead to revising theory, or it may involve addressing immediate problems (Horner 1991). Kaplan (1998, p. 322) suggested that applied research validated a theory by “putting it to good use in one’s own problem”. Neuman (2007, p. 12) argued that there are many types of applied research, but the main types are “evaluation research” and “action research”. While the evaluation research is undertaken to discover whether a program or system is working effectively and efficiently or not, action research is usually conducted to address and solve an existing problem.

Therefore, it appears that applied research has immediate practical applications. However basic research presents and supports the foundation of knowledge and develops long-term generic understanding of different areas of study.

3.5 Purpose of research

Although there are many reasons behind undertaking research, Neuman (2007) categorized the purpose of research into three categories based on what the researcher attempts to achieve.

3.5.1 Exploratory research

This kind of research aims to discover new areas that have not been investigated before in order to understand and identify some factors/variables to be addressed in future studies. Qualitative methodology is more likely to be used in such research. However exploratory research often is not linked to a particular theory and it rarely produces conclusive answers that might be generalized.

3.5.2 Descriptive research

In this type of research the aim is to provide a specific detailed description about a phenomenon where there is already a developed idea. In other words, describing a particular situation, that relates to that phenomenon. Burns (2000) reported that descriptive studies attempt to predict as accurately as possible existing situations. Such studies start with a well-identified topic and undertake a study to describe the topic more precisely. The majority of research methods (survey, case study, content analysis and historical research) can be employed in this kind of research (Neuman 2007).

3.5.3 Explanatory research

Neuman indicated that this kind of research is based on exploratory and descriptive research, where the essential aim is to present reasons and identify the driving force behind the conditions, events, attitudes, beliefs and social behaviours related to a phenomenon.

3.6 Methodology

Methodology can be understood as the theoretical approach that forms the general character of the research. Creswell (2003, p. 5, 13), Neuman (2007, p. 20) and Pickard (2007, p. xvi) reported that in particular there are two fundamental methodologies: qualitative or quantitative. However, both methodologies can be used together.

3.6.1 Qualitative methodology

Qualitative methodology is “A process of inquiry that draws data from the context in which events occur, in an attempt to describe these occurrences, as a means of determining the process in which events are embedded and the perspectives of those participating in the events, using induction to derive possible explanations based on observed phenomena” (Gorman et al. 2005, p. 3). Pickard (2007, p. 12) mentioned that qualitative research has an emergent nature rather than predefined detailed plan. Creswell (2003, p. 131) believes that qualitative research utilizes theory that is generated from main data to present a clarification for “behaviour and attitudes”.

Qualitative methodology is concerned with the in-depth understanding of a phenomenon within context more than measuring the phenomenon. Also it is not considering the “objective truth”, but it is concerned with how people understand the “truth”, in other words the “subjective experience” of the participants in reference to a specific phenomenon (Slater 1990, p. 110 and Burns 2000, p. 388). For instance if doctors do not use the medical information systems because they believe that they cannot contribute to patient care, such information (their perception) is essential to better understand their behaviour towards the medical information systems. Pickard (2007, p. 14) points out that the relationship between the researcher and the participant in qualitative research plays a key role to understanding and characterizing the complexity resulting from the interpersonal interaction of human behaviour. However it is emphasized that the relationship should be “dynamic and mutual” (Maykut and Morehouse 1994, p. 37). Qualitative methodology enables us to answer questions such as ‘why that happens’, ‘what is it that happens’ and ‘when it happens’. Qualitative data is also likely to be verbal

narrative (Gorman and Clayton 2005, p. 5) and rely heavily on interactive and humanistic tools for data collection (Creswell 2003, p. 181).

Creswell (2003, p182-183) believes that qualitative methods tend to be associated with an interpretivist epistemology, as the researcher has to make sense out of data collected, analysing data for themes or categories and make an interpretation for its meaning “personally and theoretically”. Furthermore, both inductive and deductive reasoning can be applied with qualitative research.

3.6.2 Quantitative methodology

On the other hand, quantitative methods tend to be associated with a positivist epistemology more than interpretivism. The quantitative methodology tends to use figures to describe substantial outlines of phenomena; it is more concerned with numerical data (Gorman and Clayton 2005, p. 3). The Fontana Dictionary of Modern Thought has defined quantitative methodology as “The expression of a property or quality in numerical terms” (Mann 1990, p. 44). Whereas Slater (1990, p. 109-110) argues that counting and quantifying is involved in quantitative research in order to obtain a detailed objective description (for example how often things happen and to what kind of society members) of the phenomena that there is already some information about. But if the aim is to understand human behaviour or what is happening and why that is happen, it is less likely that quantitative methodology can answer such questions. This tends to be the main purpose of qualitative methodology to answer such questions. Pickard (2007, p. 14-16) argues that a one-dimensional approach (quantitative) could not help to understand the complexity resulting from interpersonal interaction, on the other hand it is believed that a qualitative approach incorporates participant, researcher and the technique of data collection in a combined process to make a meaning out of data.

Mann (1990, p. 46) suggested that quantitative methodologies can be used to identify patterns or in making comparisons. For instance, the various information seeking behaviours of doctors in terms of using information resources and the medical information system in general can be quantified. It would then be possible

to discern their trends and preferences in this context and to make comparisons in terms of their demographic characteristics. However, that is not always the case, as the behaviour might be influenced by other factors, such as availability, the ease of use etc of sources.

3.6.3 The main difference between qualitative and quantitative methodologies

The discussion above suggests that the qualitative methodology has a potential for exploring a sensitive and complicated problem. Trochim (2006) argues that the qualitative methodology produces more detailed information that does not confine or characterize the analysis which is not the case with quantitative methods. However, the information that results from a qualitative investigation is usually not pre-organized in groups, which makes it more difficult to analyze unless it is categorized.

Qualitative methodology is more concerned with understanding an issue or phenomenon than generalizing the outcomes of the investigation (Slater 1990, p. 110). On the other hand the generalization is more appropriate with quantitative data which is the case when studying an entire population or a representative sample, where using statistical techniques it may be possible to generalise to the wider population.

While the variables and concepts are developed at the time of data collection in qualitative studies, in quantitative studies they are considered before collecting any data (Neuman 2007, p. 111).

With regard to the size of participants in both qualitative and quantitative studies, Slater (1990, p. 109-110) indicated that the larger the number of the sample of the quantitative study the more precise the generalization is likely to be. On the other hand Slater suggested that a valuable qualitative study can be conducted with as few as twenty participants.

Employing one of the methodologies is affected by different factors (Creswell 2003, p. 21 and Pickard 2007, p. 83). One of the factors is the research problem and the aim of the study. According to the authors the research problem and aim influence the choice of the research methods as some kinds of studies require a specific type of methodology. For instance, if the aim of the study is to measure or evaluate the impact of particular interventions on outcomes to decide which has more impact or in the case of generalizing the outcomes of the study then the quantitative methodology is more appropriate. On the other hand, if the problem has not been studied or there is little information about the topic and the research aim is to collect in-depth information about it to develop a better understanding of that problem then a qualitative methodology is more appropriate for the study.

3.6.4 Mixed (multi-method) methods approach

A mixed method approach means collecting and analysing both types of data (qualitative and quantitative) in one study to reach a conclusion about a phenomenon. In the mixed methods approach the different data collection techniques that are associated with both quantitative and qualitative methodologies are employed. Creswell (2003, p. 22) indicated that utilizing both of the methodologies lessens the shortcomings of both of them and increases the advantages, for instance evolving an in-depth understanding and generalizing the outcomes of the study. Furthermore, it has been reported that multi-methods or mixed methods are commonly used and it is accepted by the research tradition in the field of library and information science in general (Gorman and Clayton 2005, p. 12-13).

Creswell (2003, p. 215-219) illustrated that there are six key strategies in order to conduct mixed method research. The first strategy is the sequential explanatory strategy. With this strategy quantitative data are collected and analyzed first, followed by collecting and analyzing qualitative data.

The second is the sequential exploratory strategy. This strategy is in contrast to the sequential explanatory strategy, where qualitative data are collected and analyzed first, followed by gathering and analyzing quantitative data. However in

both of these strategies qualitative and quantitative data are not applied in one stage.

The third strategy is the sequential transformative strategy. In this strategy there may be a different stages for quantitative and qualitative data, they might also be conducted in one stage. Although theoretical perception may or may not exist in sequential explanatory or exploratory strategies, the study with sequential transformative strategy is guided by a theoretical perception. Sequential transformative strategy is the same as the previous strategies in reference to integrating the results of both stages in the interpretation (discussion) stage.

The fourth is the concurrent triangulation strategy. This strategy is chosen when different techniques are utilized in order to validate outcomes in one study. Overall this strategy is selected in order to compensate for the drawbacks of one technique with the strengths of the other technique; collecting qualitative and quantitative data has equal priority and takes place in one stage. The findings of qualitative and quantitative studies are integrated in the interpretation stage. With this interpretation the argument can be supported as long as a convergence is noted, or an explanation is provided in the case of lack of convergence.

The fifth is the concurrent nested strategy. In this strategy both qualitative and quantitative data are collected in one stage. However, this strategy has a predominant method (unequal priority) with a method with less priority embedded within it. The qualitative and quantitative data are incorporated in the analysis stage.

Finally the sixth strategy is concurrent transformative strategy. This strategy shares some features of concurrent triangulation and nested strategies. It is the same as triangulation and nested in reference to conducting qualitative and quantitative data collection in one stage (which might be given equal or unequal priority), as well as integrating both qualitative and quantitative data in the analysis or in the interpretation stage. However this strategy is directed with a theoretical perspective.

3.7 Research methods

Pickard (2007, p. 83) defined research methods as a “bounded system created by the researcher to engage in empirical investigation”. This means that the research method is the comprehensive approach to exploration. Moreover, Pickard believes that rarely there is a differentiation between research methods and research techniques. Although there is an implicit understanding of the differentiation, this is not the perfect approach to a carefully constructed research design.

There are several research methods, and the most commonly used are:
Survey,
Case study,
Experimental,
Historical,
Content analysis

However, choosing research methods depends on the research problem and the aim, the audience, resources limitations and the personal experience of the researcher (Creswell 2003 and Pickard 2007).

Survey

‘The survey’ study is a research method utilized to collect and analyse standardized information from a specific community using a representative sample of that community (Pickard 2007, p. 95). Also Pickard argues that a survey study mainly aims to:

Measure relationships between variables that should be identified at the beginning of the study and clarified as hypotheses or research questions or illustrate specific characteristics of a community.

The definition and the aim of survey studies suggests that surveys can be a complicated and involve discovering and analysing relationships or simply studies that provide basic statistical facts.

Burns (2000, p. 566) indicated that there are two main types of surveys descriptive and exploratory survey. The descriptive survey is conducted to estimate as accurately as possible an existing state or the characteristics of a people. Alternatively the exploratory survey aims to discover a “cause and effect” connection without experimental intervention. However, Pickard (2007 p. 97) argued that the ability of a survey to identify a “cause and effect” relationships is questionable. She believes that the closest we can explore within human nature using a survey is a correlation between variables rather than causation.

According to Pickard (2007) both qualitative and quantitative methodology can be employed in survey studies. However, she suggests that quantitative study is more often included in survey studies. Additionally, a survey study is not limited or specified by using particular data collection techniques, but the different data instruments can be used in a survey study. The research techniques or instruments that can be used to collect data are discussed in the next section.

Surveys more often follow sequential stages, as each stage usually forms the base of the next stage. Based on Pickard’s (2007, p. 97-100) conclusion, the survey process starts with identifying a subject area to be studied; then investigating the previous literature in that area to build a solid background about the topic, and to clarify the aims and objectives of the study. Then the researcher has to identify the population and choose a suitable sample (if necessary) using appropriate sampling techniques. Next, selecting and designing data collection instruments starts, and it is important to pilot the data collection instruments to examine the clearness of the questions and efficacy of the methods. After that it is the stage of data collection or the fieldwork. Finally, the process ends with data analysis and presenting the results of the study.

3.8 Research technique

There are many research techniques that can be employed to collect the raw data of the research. The more frequently used techniques are:
Questionnaire,
Interview,
Focus group,
Experiment,
Critical incident

Questionnaire

This technique has been widely employed to collect data from a considerable number of people at a low cost (time, effort and money). Burns (2000, p. 571) defined the questionnaire as “Pre-determined questions that can be either self-administered (it may yield a higher response rate of completing the questionnaire, as the researcher meets the participants and ask them questions and records their answers on the questionnaire document). It can be administered by mail or asked by interviewers”. Neuman (2007, p. 167) argued that a questionnaire is a proper instrument for investigating self-reported beliefs and behaviour.

Interview

The interview method is quite often used to collect more in-depth, qualitative and descriptive data, that can answer ‘why’ questions. Interviews can be used to investigate and develop a better understanding of a phenomenon. Rubin and Rubin (2005, p. 2) suggested that the interview technique can be used to collect data about people’s thoughts, opinions and feelings about particular issue. Moreover they reported that an in-depth interview offers the opportunity to get detailed information by asking people to explain their response, describe their experiences and provide examples.

Gorman et al. (2005) reported that there are two types of interview, structured and unstructured interviews. The structured interview is a set of predetermined questions prepared by the interviewer. Pickard (2007, p. 175)

demonstrated that there are two kinds of structured interview, standardized open-ended and closed fixed-response interviews. Pickard explained that the standardized open-ended enables the interviewer to ask all interviewees the same questions without constraints on the information they would like to provide. The fixed-response interview is one in which all interviewees are asked the same questions and limited to selecting their answers from predetermined answers. The structured interview is controlled by the framework of the interview, therefore the interviewer has no opportunity to interact with respondents and stimulate further data apart from the questions' answers.

The unstructured interview is conducted to acquire a comprehensive understanding of the peoples' opinions, beliefs, thoughts and feelings. Gorman et al. (2005) reported that the standardized open-ended interview has predetermined questions and the interviewer is restricted to these questions. On the other hand in an unstructured open-ended interview, the interviewer is not restricted to the questions and the answers of the interviewee may drive the interviewer to ask more questions to obtain further data. Hence the questions may vary from interview to interview. However, Burns (2000, p. 582) suggested that it is significant to ask the same question for all the interviewees in cases where comparable data are required.

3.9 Methodology used in previous literature

A wide variety of methodologies has been utilized to investigate and identify doctors' information needs and their information seeking behaviour. The different studies have used both qualitative and quantitative methods. For instance Deshpande et al. (2003), and Bryant (2004) used qualitative and quantitative methods. Torre et al. (2003) and Change (2004) used quantitative methods. Furthermore, different data collection instruments have been employed. For instance Dee (1993) used semi-structured face to face interview and observations, Deshpande et al. (2003) used face to face interview and group discussions, Torre et al. (2003) used mail questionnaire. Bryant (2004) used in-depth unstructured interviews and group discussions. Change (2004) used mail questionnaire and structured face to face and telephone interviews.

Recognised needs

The previous literature has identified that doctors have recognised needs and unrecognised needs, however when it comes to identifying recognized information needs using interviews, Gorman (1995) indicated that there might be bias, due to the influence of interviewer, where people might be prompted to respond to that influence rather than to the real situation. What is more he demonstrated that the possibility for neglecting information needs is possible when observation methods are used, owing to the possibility of recognized needs unintentionally not being articulated. In addition Bryant (2004) indicated that the 'prestige bias' may have an impact on the study outcomes.

However, the efficacy of these methods depends, partly, on how well they are implemented. It could be suggested that problems resulting from using one of the methods, might be avoided by using both of them, to benefit from their advantages and to compensate for their deficiencies. Forrest and Robbt (2000) believe that the best technique for collecting data about the information needs of doctors in training is to combine more than one method particularly, where those people are often busy and lack the time. Using a questionnaire for instance, to reach as many potential respondents to collect as much data as possible, and to include interviews and or focus group discussions for the purpose of obtaining in-

depth information for the issues that may be superficially investigated when using closed questions in a questionnaire. Bradley (1993) also considered that synthesizing data collected using variant methods from diverse sources, helped develop a better understanding of a problem.

3.10 The study focus

Based on the above discussion this PhD. research can be categorised as exploratory study. The purpose of the research is to explore Libyan doctors' information needs and their information seeking behaviour in order to develop a better understanding of this subject. This subject has not previously been researched. However, it also has an explanatory component whereby the impact and validity of previously identified variables will also be explored.

With regard to research methodology, for the purpose of this research a decision has been made to choose a multi-method approach (both quantitative and qualitative). The main reasons behind this decision are: to increase the understanding from the quantitative data method by getting more in-depth information from the qualitative data about Libyan doctors' information needs and information seeking behaviour. In addition it will be possible to validate the results of the previous studies, finally to integrate the advantages of both methods. The qualitative methodology has been chosen in this study to investigate doctors' information needs as well as to understand their information seeking behaviour from their perspectives. The quantitative methodology has been chosen to make comparisons based on some related factors or variables between urban and rural doctors and to identify any differences or similarities between them.

The strategy that has been chosen to conduct the mixed method approach is the "Concurrent triangulation strategy". This approach is chosen to compensate for the drawbacks of any one method. With this strategy there is no need to collect the quantitative and qualitative data in different stages, rather it is collected in the same phase, and the emphasis is equal between the qualitative and quantitative methods and the results of both qualitative and quantitative data are integrated in the interpretation phase (Creswell 2003, p. 217).

Concerning the research method, as the main purpose of this research is not to examine, evaluate or experiment but to investigate some facts about a particular community and to make a comparison between the community groups, an exploratory survey method was chosen to be the research method in this study. The exploratory survey can help to investigate correlations between variables such

as gender, age, work place, speciality, professional degree, occupation and doctors' information needs as well as can help to illustrate the characteristics of doctors' information seeking behaviour and their information needs. Furthermore, both qualitative and quantitative methodology can be employed in this survey study.

Regarding the research techniques, for the purpose of this study a paper based questionnaire and face to face interviews (along with critical incident techniques embedded in the interview) were chosen as the research techniques of data collection.

The questionnaire was chosen as it is widely employed to collect data from a considerable number of people at a low cost (time, effort and money). As this study includes Libyan doctors who are located in different areas of Libya the questionnaire can help to eliminate the geographical limitations; in this respect it will save considerable costs (time, effort and money). Questionnaires can help to facilitate collecting data from a larger sample than would other techniques, the questionnaire offers confidentiality and anonymity, responses can be coded (in the case of close ended questions) and the method to analyse the data can be identified before distributing the questionnaire. What is more, the respondents (doctors) can respond to the questionnaires in their own time compared with the other techniques that require responding in a specific time therefore the response rate could be increased. Also the questionnaire was chosen to collect quantitative data that will help to make comparisons as well as to help make generalizations. However the questionnaire included some open ended questions to explore some ideas that will be investigated in more detail using one to one interviews.

The in-depth one to one interview was chosen due to the fact that it offers the opportunity to obtain detailed information by asking doctors to explain their response, describe their experiences, provide examples and they can use their own words. The face to face interview is flexible, therefore there is potential to repeat or explain unclear questions, which in turn encourages doctors to respond. The face to face interview also was chosen to explore initial findings from the questionnaire as well as to collect more in-depth information about the issues that

were not investigated in-depth in the questionnaire. Hence, the interviews overcame the weaknesses, to some extent, of the closed questions of the questionnaire by offering the opportunity for more detailed comments about particular issues. The face to face interviews also avoided the influence of group pressure, or potential embarrassment due to ignorance.

Drawing on ideas from the previous literature and the variables that have been identified in the previous information behaviour research, the questionnaire was distributed first. This should ease the process of gaining interviews and to stimulate the participants' thoughts.

3.11 The study process

This section provides detailed information about the study population including the technique that was chosen to select the sample; the sample size and the hospitals that are selected to access the population of the study, in addition to the study techniques including the contents of the tools; the pilot study; data collection process and the analysis techniques.

3.11.1 The study population

The study population consisted of Libyan national doctors who have a medical certificate to practise in the context of patient management in Libyan hospitals. The main reasons for choosing hospitals were: a large number of Libyan doctors work in the hospitals; second the complicated, acute and cold cases are managed in the hospitals; there is a wide diversity of patient cases that are managed within the hospitals which may lead to a broad range of information needs and information seeking behaviour. This in turn imposed the need to show the importance of study to those people in helping them to meet their needs, in order to help to improve the health services. The study population therefore comprised a combination of general practitioners and specialists who were working in hospitals located in urban and rural areas in Libya.

3.11.2 The study sample technique

For the purpose of collecting quantitative data for this study, all rural hospitals and consequently all Libyan doctors who are working in these hospitals were targeted. Regarding the urban area a simple random sample approach was chosen to identify the targeted setting (hospitals) and consequently the population needed for this study in the urban area. The main reason for choosing a simple random sample approach was the lack of detailed information about the study population, e.g. number of doctors based on their specialities and gender or specialities based on gender or location. Lack of such information makes it difficult to choose any other kind of sampling, for instance stratified sampling or cluster sampling.

With regard to the qualitative data, in order to acquire rich information a convenient sample of both urban and rural doctors was chosen to collect the qualitative data. Detailed information about the sample size and how it was chosen for both the quantitative and qualitative approach is provided in the next paragraphs.

3.11.3 The study sample size

3.11.3.1 The quantitative population sample size

The sample size is affected and controlled by a number of factors, e.g. money, effort and particularly time available to conduct the study. Recent statistics issued by the Libyan Health Ministry (2007) showed that of the total number of Libyan hospitals (96 hospitals), 77 (80%) of the hospitals are located on the Libyan coast and only 19 (20%) of the hospitals are located in the south. Furthermore the statistics showed that the number of hospitals that are located in urban areas are 64 (67%) hospital and 32 (33%) are located in rural areas.

The total number of Libyan and non-Libyan doctors who work in the hospitals is 6235. Libyan national doctors numbered 5481. Of 5481 Libyan national doctors only 47 work in a rural area and the remained 5434 work in an urban area. The number of Libyan and non-Libyan doctors who work in hospitals located on the coast is 5892; the number of doctors who work in hospitals located in the south is 343.

Because the total number of the study population was known (5481) using the raosoft software (www.raosoft.com), it suggested that the appropriate and acceptable sample size for this study would be 360 respondents with margin of error of 5% and confidence level 95%, or 258 respondents with margin of error of 5% and confidence level 90%.

Hence, in order to choose the sample for the purpose of the quantitative study, the Libyan hospitals were geographically divided into four groups, three groups include all the hospitals located on the coast (because the Libyan coast is

about 1900 km, all hospitals within approximately six hundred kilometre form a group) and one group included the hospitals located in the south of Libya.

Figure (3.1) the different areas that were used to select urban hospitals for the sample of the study

A simple random sample was applied to choose two hospitals located in an urban area from each group. The researcher recorded the name of each hospital on paper, and then each group names were mixed together and a slip was picked to select a hospital. After recording the name of the hospital the slip was returned and mixed with the other slips to secure an equal opportunity for all other hospitals to be chosen. The same process was done with all the groups. With regard to the rural area, all Libyan doctors in all of the rural hospitals were included in the study.

The hospitals that were selected by the random sample from urban areas were:

Area one:	Misratah Central Hospital	Yafran Hospital
Area two:	Al Jamhoria Hospital	Seven October Hospital
Area three:	Al Bayda Hospital	Al Marj Hospital
Area four:	Awbary Hospital	Sabha Hospital

The total number of Libyan national doctors who work in these hospitals is 982 in addition to 47 Libyan national doctors in rural hospitals, and the total of both rural and urban doctors is 1029 doctors. All Libyan national doctors who work in each of the selected hospitals and the rural hospitals were targeted in this study.

3.11.3.2 The qualitative population sample size

For the purpose of selecting the participants for the qualitative part of this study, there was a question at the end of the questionnaire, which was distributed to collect the quantitative data, asking for more personal details of the participant if s/he would like to participate in the qualitative research. Although some of the participants agreed to be interviewed, not all of the respondents provided a phone number to be contacted (they provided only their names). To arrange for the interview to be conducted, the researcher contacted only the doctors who provided a phone number, however not all the doctors who had already provided their personal information to be interviewed agreed to conduct the interview when they knew that it would be voice recorded. Consequently, the researcher arranged to interview the doctors in the hospitals. A general meeting with the doctors in the common room was conducted to explain the aim of the study and the importance of the interview process to obtain more in-depth knowledge about their information needs and information seeking behaviour.

Results from the general meetings were that doctors agreed to be interviewed. However, not all those doctors were interviewed, as some of them did not attend on the day of interview, and some of them apologized and refused to arrange for another appointment. The researcher continued to meet doctors in the doctors' common room in the different hospitals, asking for their consent to be interviewed. The same process (meeting doctors and asking for their consent to be interviewed then arranging an appointment and if they did not attend another meeting was arranged and so on) was adopted until thirty four interviews were scheduled.

3.11.4 The Study Technique

3.11.4.1 First quantitative techniques

For the purpose of quantitative methodology, a questionnaire was prepared, to collect quantitative data. The questionnaire was appropriate in this study for collecting data from doctors in hospitals in a wide geographic area. Data collected from a large number of doctors using the questionnaire was used to help making generalizations about information needs and the information-seeking behaviour of Libyan national doctors working in Libyan hospitals. In addition, the questionnaire helped collect a large amount of personal and job information, such as gender, age and speciality from the large number of doctors and enabled comparisons.

Based on the literature review certain factors seemed important. For example it was thought useful to capture personal data including age and gender to make the different comparisons. Also job information since it was thought that this would indicate the impact of work on doctors' information needs and their information seeking behaviour and consisted of six questions. The third theme included information needs; this theme helped to explore doctors' information needs and involved two questions. The fourth theme included information channels, this theme provided information about the different channels that are used by Libyan doctors to access information sources and consisted of four questions. The fifth theme investigated information sources used and the characteristics that influence its use, it consisted of four questions. The sixth theme included information skills; it consisted of four questions to explore the impact of information skills on the information seeking behaviour in addition to one question that focused on investigating problems encountered by Libyan doctors when searching information sources.

3.11.4.1.1 Pilot study

It is important when conducting research to ensure the validity of the questions of the data collection instruments whether the questionnaire or the interview i.e. whether the questions indeed can measure what they are intended to measure. A pilot study was conducted using the study instrument with a number of

doctors of the same population of the study who checked the validity by adding questions, eliminating the poor questions and clarifying the vague questions. Burns (2000, p. 585) suggested that two of the remarkable types of validity are content validity and face validity. Face validity can be measured by asking some experienced people in the subject of the investigation to examine the questions and evaluate whether they can ask about what they are intended to ask. Content validity uses a particular statistical formula to judge the response of the panellists, who are asked to evaluate each single question in a test (questionnaire) by indicating whether it is essential, useful but not essential, or not necessary. Furthermore the stability of the questionnaire can be assessed using test and re-test design, Cronbach's alpha or split-half reliability to ensure that respondents would record the same response to a question if the test were repeated under the same conditions.

For the purpose of this study the instrument of measurement was piloted to measure the face validity using a judging panel, participating in a pre-test as well as split half test and Cronbach's alpha used to examine the stability of the instrument, the final questionnaire is in Appendix number one.

3.11.4.1.2 Face validity results

A pilot study was conducted to determine the validity of the questionnaire questions. Five doctors from a medical speciality and three academic doctors from psychology, education and information science at the University of Garyounis were sent the questionnaire and asked to review it and provide comments. The panellists were given detailed information about the main aim and the objectives of the study to be able to evaluate and gauge whether the questionnaire questions are valid and clear.

Some changes were suggested by the panellists. The first suggestion was for question five:

5- What other work are you engaged in? (Choose all that apply)

Research ☐ Teaching ☐ Management ☐ Further study ☐

The three of academic doctors recommended adding a ‘none’ category to this question.

The second suggestion was for question eight

8- On average how many questions do you ask about a patient case and seek answers for them using information sources?

Less than 5 ☐ between 5 to10 ☐ more than 10 ☐

Four out of five doctors in the medical field think that it is difficult for doctors to find the average of questions based on each single patient. They suggested it is better to be based on all the patients per day.

The third was related to the choices of question number twelve, whereas one of the academics and four of the medical panellists suggest not using the choice of (Never) as it is unbelievable that doctors do not use the different information channels to meet their information needs.

The fourth suggestion was for question number fifteen

15- To meet your professional information needs, could you please rank (1-11) the following information sources according to your actual use first then according to preference.

Sources	Currently used	Would prefer to use

Two of the doctors, one from the medical field and one from education science, suggested that the question could be a little confusing and too long for the respondent to answer, as they need to order the information sources twice. Their suggestion was to ask the respondent to order based on either their current use or preferred use.

Finally, two doctors from a medical field and one from a psychology department recommended more explanation for question number twenty three

23-What problems do you usually encounter when searching the following information sources? (Choose all that apply)

Source / problem	Book	Journal articles	Proceeding	Professional newsletters	Online database	Database on CDs	Internet	Personal contacts

3.11.4.1.3 Participating pre-test

Furthermore, a pre-test was conducted to verify the effectiveness of the questionnaire. Twenty copies of the questionnaire were distributed to doctors who work in a hospital located in an urban area and to doctors who work in a rural area. Only thirteen completed questionnaires were returned, the other seven doctors stated that they were too busy and did not have time to fill in the questionnaire. The pre-test showed that three out of thirteen respondents left question number five unanswered. Five out of thirteen respondents left question number fifteen without any answer or answered the section related to the actual use and did not answer the section related to 'would prefer to use'.

Based on the panellists' recommendations and the result from the questionnaire's pre-test, some changes to the questionnaire were made

'No other work' option was added to question number five.

Question eight was changed to be

8-On average how many questions do you ask about patients' cases per day and seek answers for them using information sources?

Concerning question twelve the choice (Never) was changed to be (every more than month).

With regard to question fifteen it was changed to be

15- To meet your professional information needs, could you please rank (1-11) the following information sources according to your actual use?

Finally, question twenty-three was changed to

23- In this question you will find number of problems that you may face when you search paper sources, some problems that you may face when you search electronic sources, and other problems that you may face when you search either paper or electronic sources. Please tick the problems you face with any source?

3.11.4.1.4 Questionnaire reliability

The reliability of the questionnaire was measured using the split-half method, which measures the internal consistency of each question with the other questions in the measurement. The result of the split-half reliability was acceptable for the instrument in an early stage of development. The reliability using the Spearman-Brown coefficient = (.829), this result is very high.

The internal consistency was also measured using Cronbach's alpha which does not require item splitting as in the split-half which is the main disadvantage of the split-half, as the different split of the two halves of the test generates different reliability. The internal consistency using Cronbach's alpha was higher than the split-half, as it was (.857). The square root of the reliability coefficient yields the validity coefficient which is (.921). Therefore the questionnaire is a valid instrument with reasonable reliability. The final questionnaire is shown in the appendix two.

3.11.4.2 Second qualitative technique

With regard to the qualitative study, a one to one interview including critical incident technique was conducted by the researcher himself with a convenient sample of Libyan national doctors from rural and urban areas (the total number was forty three interviews). The interview technique was chosen to get more in-depth knowledge about the information needs and information seeking behaviour of Libyan doctors; also to explore in more detail some initial findings from the

questionnaire. The interview, and in particular the embedded critical incident technique, was appropriate for this study as it helped to understand the real doctors' information needs and their information seeking behaviour, by asking them to describe a situation where they experienced an information need, rather than the bias of guided questions and answers. An interview is also appropriate for this study to ask questions such as how can some kind of information sources help them perform their work, why they prefer using some kinds of sources, why they do not use other kinds of sources to meet their needs, to understand their perceptions about the mediators (librarians) to help meet their information needs and so forth. It is essential to find answers for such questions in order to understand doctors' information needs and their information seeking behaviour to meet their needs.

A set of initial interview questions was developed based on the literature review. A semi structured interview was intended to allow more questions to be asked during the process of the interview in response to answers. However, a question guide was prepared to help in asking all the interviewees the same questions. The final copy of the interview questions was developed after collecting and reviewing the received questionnaires from the quantitative study. No major changes were done to the initial copy of the interview questions. The final copy of the interview is shown in Appendix three.

The main reason for including the critical incident technique was to explore the actual information needs and information seeking behaviour of doctors. The interviewee was asked to focus on a critical incident that they experienced during their work. First they were asked to identify the incident, and then they were asked to describe the incident. After that they were asked to describe what they did to solve the problem and why in that particular way. Finally they were asked to evaluate whether the problem was solved or not.

The process of each interview started with introducing the equipment used for recording. Then the interviews started with gathering general information. Following this the interviewees asked for more detailed information. Finally the critical incident technique was applied by asking the interviewee to remember a

situation where he/she found himself needing information to manage the situation and by asking them to give details about it.

Each interview was conducted in one single session and the average duration of the interview was estimated to last for about forty five minutes. However, when the actual interviews conducted with the interviewee the average was approximately between twenty five and thirty five minutes, and did not exceed the expected time.

3.11.5 Data collection process

The quantitative data collection process started on 10/2/2009 until 2/4/2009 The qualitative data interviews started on 3/4/2009 until 17/4/2009

For the purpose of quantitative data collection the researcher contacted the head of each selected hospital to obtain the consent to be able to distribute the questionnaire. With some hospitals a number of the questionnaires were given to the head of the hospital or the head of the medical affairs department to be distributed in a particular way. Some hospital heads asked that questionnaires should be given to the head of each department to be distributed by them. With some other hospitals the head of the hospitals gave the consent for the researcher to contact doctors directly to distribute the questionnaires. A week later the head of the hospitals and the head of the departments who distributed the questionnaires, were reminded by contacting them personally or by telephone. Another week later they were reminded again. At the end of the third week when the head of the hospitals and departments were contacted, they informed the researcher that some of the questionnaires had been returned. The researcher collected the questionnaires from the hospitals that were near to his area. During the period a contact for the purpose of reminding was done approximately each three days. At the end of March the researcher asked the head of the hospitals to send all returned questionnaires by mail to the researcher's address.

For the hospitals that had asked to contact doctors directly, the researcher went to the doctors' common room in each department and introduced himself to

doctors and asked them to take part in his study. Some of the doctors responded and filled in the questionnaire immediately, some took the questionnaire and promised to return it later and some refused to take part in the study. This was done every day and doctors were frequently reminded to fill in the questionnaires they had received.

3.11.6 The response rate

In total a thousand and twenty nine questionnaires were distributed three hundred and thirty four questionnaires were received. Two hundred and fifty six were valid for the study. The table (3.1) shows figures and response rates

Table (3.1) The response rate of the study sample

Area	Total distributed	Returned	Rate	Valid	Rate
Urban	982	290	29.53%	215	21.89%
Rural	47	44	93.62%	41	87.23%
Sum	1029	334	32.46%	256	24.88%

3.11.7 Data review

All the questionnaires were reviewed immediately after they were received from the respondents, to check whether they were completely filled in or not. Then they were reviewed again to collect the valid questionnaires to be prepared for computer data entry and analysis using SPSS software.

3.11.8 Interview translation

In total thirty four interviews were conducted. As the interviews that were used in this study were based on the Arabic language the data were translated into English with an attempt to keep the Arabic meaning as close as possible. However, not all the interviews were transcribed, as only twenty two were translated and transcribed into English and the other fourteen were only listened to. The main reason for not transcribing them is the fact that there was not any specific information in them that was not mentioned in the other interviews.

Although the other fourteen were not transcribed completely, they were listened to and notes about the concepts and the ideas that were mentioned in them were taken.

3.11.9 Analysis tools

With regard to the quantitative data some descriptive and analytical statistics are used, such as frequency tables, percentages and graphs in this study to display the study outcomes. In addition, non-parametric statistics were used for analysis to investigate whether there was any difference between rural and urban doctors' information needs and information seeking behaviour. The Chi-Square test was used to evaluate the statistical significance of the difference between rural and urban doctors' information needs and information seeking behaviour with tables that have not expected frequencies less than five in the cells. Chi-square was used as it is an appropriate test for nominal and categorical variables. Fisher's exact test is also used to calculate an exact P-value for tables when the expected frequencies number in the cells is less than five, and for which the Chi-square test is not appropriate.

As for the qualitative study, a thematic approach was chosen to analyse and describe (to code) the qualitative data. Choosing a thematic analysis approach was due to several reasons, not least the research questions can be answered using this approach and the time limitation as well. Also a thematic approach can help simplify the complex and large amount of information into themes in order to develop more understanding about the issue. It also helps to find gaps in the themes and allow new ideas to be developed as well as to identify any differences in the themes. Furthermore Lacey and Luff (2007) concluded that with thematic analysis the potential is there for including previous and evolved ideas in the coding process. The themes of the analysis (that works as a framework of areas) were identified from ideas from previous research, the research questions, the interview questions as well as the emergent concepts from the interviews.

3.12 Summary

To sum up this chapter started with a discussion of three research philosophical schools, positivism, post-positivism and interpretivism. Then, the research definition, types and purpose was discussed as well as the different research methodologies and techniques. This was as an introduction to this research focus. The research focus started with identifying a multi-method approach as the methodology in this study. The main reason for that was to increase understanding gained from the quantitative data by obtaining more in-depth information from qualitative data and to integrate the advantages of both methods. Concurrent triangulation strategy was chosen to conduct the quantitative and qualitative study. An exploratory survey was the research method, and a paper based questionnaire and face to face interviews (along with critical incident techniques embedded in the interview) were the research techniques used to gather data. Finally this chapter discussed the overall process of this study starting with discussion of the sampling process then the pilot study then the process of data collection after that the analysis tools used in this study.

Chapter four Quantitative results of information needs

4.1 Introduction

It is recognized that information systems have been established to help meet users' information needs. Therefore, it is important to recognize that identifying users' information needs is fundamental to develop information systems, in order to provide efficient and effective information services. This chapter analyses urban and rural doctors' information needs in the light of some factors that might influence these needs. Furthermore the driving purpose behind doctors' information needs is analyzed.

4.2 Characteristics of respondents

Table (4.2) The number of urban and rural doctors sample

Area	Number	percentage
Urban	215	83.98%
Rural	41	16.02%
Sum	256	100%

There were 256 out of 1029 (24.88%) valid questionnaires. Table (4.2) demonstrates that urban doctors represent 83.98% of the respondents and rural only 16.02% of the sample of the study and that is due to the fact that fewer numbers of Libyan national doctors working in rural areas compared to urban areas.

Of these 256 doctors 136 (53.1%) were male and 120 (46.9%) female. The respondent's age was categorised into three groups, the first category includes thirty four years old or less (138, 53.9% of the respondents), the second category is comprised of doctors aged between thirty five and forty four years old, (88, 34.4% doctors) and the third category was doctors aged forty five years or more (30, 11.7% of doctors). This indicates that the majority of the respondents can be categorised between twenty four (the minimum age in this study) and forty four years old.

With regard to the speciality, it appears that more than one third (37.9%) of the responding doctors are in general medicine followed by surgeons (21.9%) and

together these comprised more than half of the respondents. Table (4.3) shows the number and the percentage of respondents according to their speciality.

Table (4.3) Response rate based on doctors' speciality

Speciality	Number	Percentage
General medicine	97	37.9%
Gynaecologists	28	10.9%
Paediatricians	27	10.5%
Dermatologists	18	7.0%
Surgeons	56	21.9%
Anaesthesiologists	5	2.0%
GPs	25	9.8%
Total	256	100%

Based on their professional degree (career grade) the respondents were classified into three groups (SHOs, Specialists and Consultants). SHOs were the largest group, they numbered 195 (76.2%) out of 256 doctors, specialists are 47 (18.4%) and consultants the lowest number with 14 (5.5%)

To know how busy doctors were, they were asked to indicate the average number of patients they managed to see per day and the duration of these management sessions. The results show that on average both urban and rural doctors manage to see more than fifteen patients a day and consultation and management sessions last between ten to fifteen minutes. 33 out of 41 (80.5%) of the rural doctors showed that they manage more than fifteen patients per day and 23 (56.1%) of them indicated that the patient consultation sessions last between ten to fifteen minutes, similarly 101 out of 215 (47%) of urban doctors indicated that they manage more than fifteen patient a day and the management sessions last between ten to fifteen minutes.

However, both urban and rural doctors were busy and the data collected showed that they always needed information related to daily work. Doctors were asked to indicate the total number of questions they asked about the patients'

cases and looked for information about them in the different information sources. The results show that 105 out of 215 (48.8%) of the urban doctors seek information for five to ten questions about the patients' cases per day. Likewise 25 (61%) of rural doctors search information to answer between 5 to 10 questions per day.

4.3 Doctors' information needs

Based on the fact that doctors are in need of information in order to manage patients' cases they were asked to specify the degree of importance of different kinds of information. The degree was identified using a five point Likert scale (very high to very low) this scale was chosen to give more freedom to the respondents to chose more appropriate answer. The different kinds of information ranged from patient data which include all specific information related to a specific patient case (the patient history) to general information about diagnosis, investigations, treatment and medical knowledge in general. The results demonstrate that both urban and rural doctors are 'very highly' to 'highly need' the different kinds of information needs with the exception of both population statistics and the referral data.

4.3.1 Urban doctors' information needs

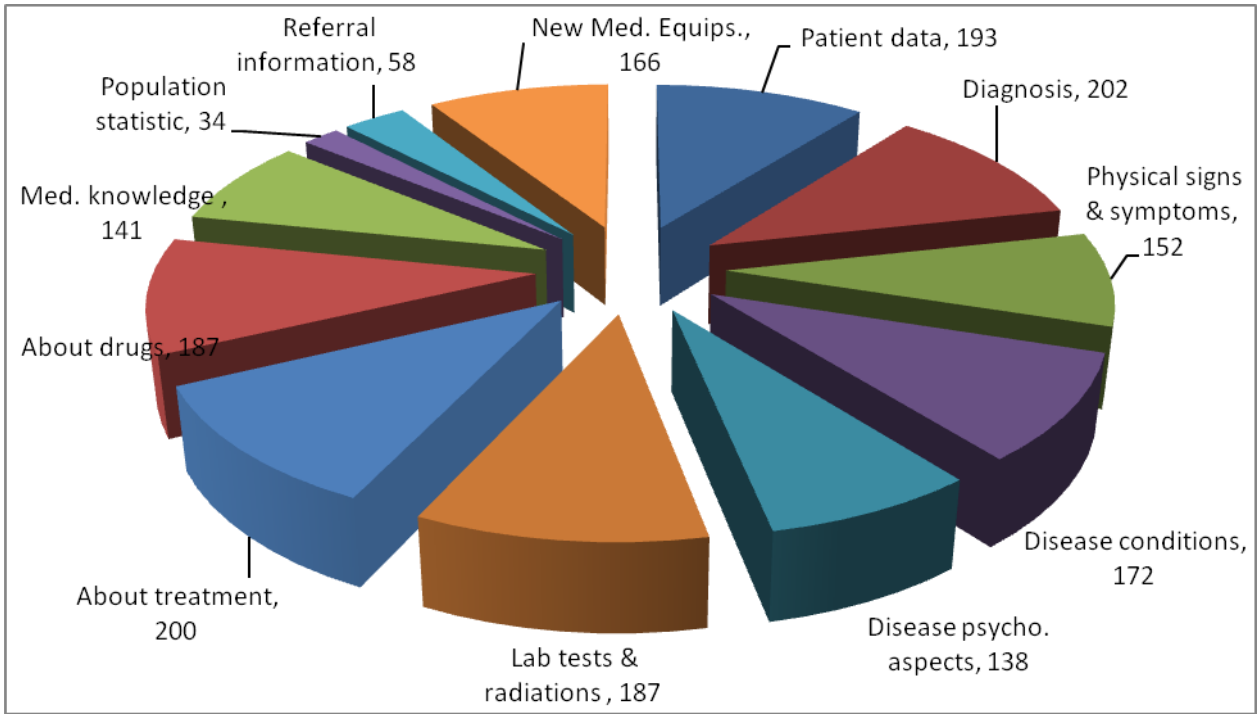
According to Table (4.4) which demonstrates the degree of importance of different information for urban doctors, it could be argued that information about diagnosis is the first 'highly important' information. It is indicated between very high to high by 202 (93.95%) out of 215 of urban doctors, followed by information about treatment in general with 200 (93.02%) of doctors, then information about patient data which numbered 193 (89.76%) of the respondents, after that information about drugs and lab tests and radiations with 187 (86.97%) for each of them.

Table (4.4) Degree of importance of different information for urban doctors

Importance / Information	V. high	%	High	%	To some extent	%	Low	%	V. Low	%
Patient data	142	66.0	51	23.7	18	8.4	4	1.9	0	0.0
Diagnosis	162	75.3	40	18.6	10	4.7	3	1.4	0	0.0
Physical signs and symptoms	102	47.4	50	23.3	49	22.8	9	4.2	5	2.3
Disease conditions	90	41.9	82	38.1	40	18.6	3	1.4	0	0.0
Disease psycho. aspects	64	29.8	74	34.4	61	28.4	15	7.0	1	0.5
Lab tests & radiations	145	67.4	42	19.5	23	10.7	5	2.3	0	0.0
About treatment	123	57.2	77	35.8	12	5.6	3	1.4	0	0.0
About drugs	107	49.8	80	37.2	23	10.7	5	2.3	0	0.0
Medical knowledge	80	37.2	61	28.4	64	29.8	8	3.7	2	0.9
Population statistics	13	6.0	21	9.8	74	34.4	74	34.4	33	15.3
Referral information	25	11.6	33	15.3	80	37.2	59	27.4	18	8.4
New Med. Equips.	95	44.2	71	33.0	34	15.8	10	4.7	5	2.3

Population statistics are the least important information. 181 (84.18%) of doctors placed it between ‘to some extent’ to ‘very low’, followed by referral information with 157 (73.02%). figure (4.2) illustrates the different information needs of urban doctors.

Figure (4.2) Urban doctors' indications of 'very high' to 'high importance' of different information



4.3.2 Rural doctors' information needs

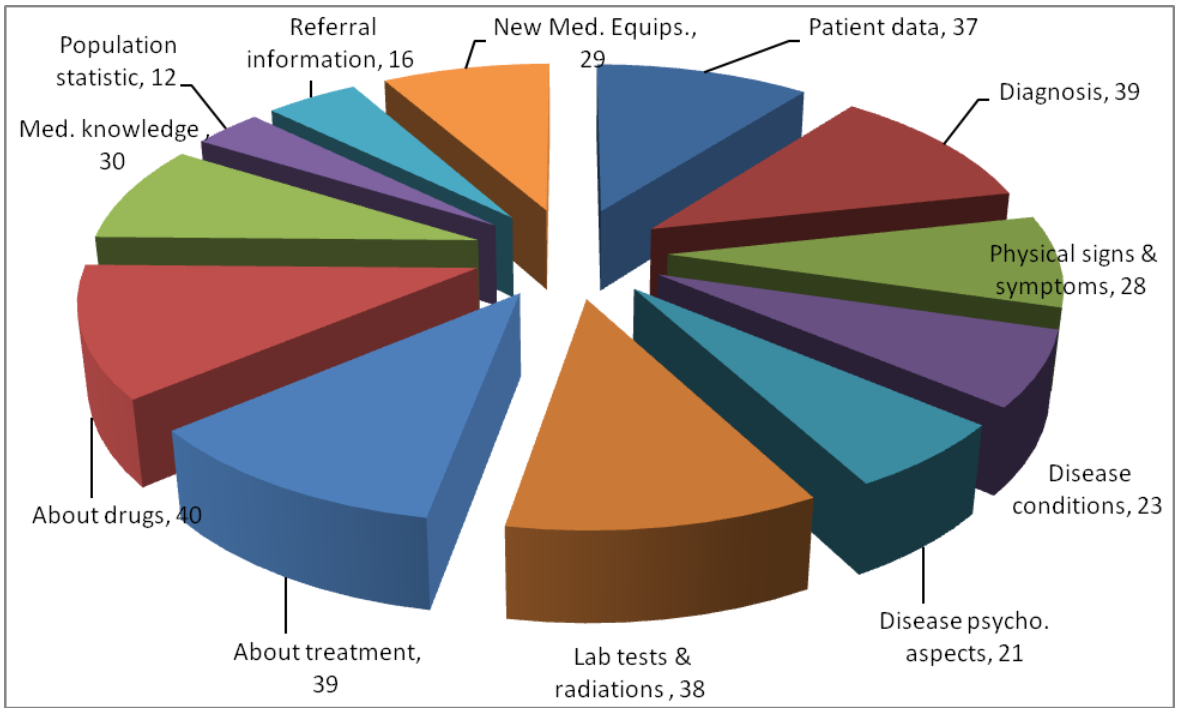
With regard to rural doctors Table (4.5) demonstrates the degree of importance of different information for rural doctors.

Table (4.5) Degree of importance of different information of rural doctors

Importance / Information	V. high	%	High	%	To some extent	%	Low	%	V. Low	%
Patient data	27	65.9	10	24.4	4	9.8	0	0.0	0	0.0
Diagnosis	27	65.9	12	29.3	2	4.9	0	0.0	0	0.0
Physical signs and symptoms	17	41.5	11	26.8	11	26.8	1	2.4	1	2.4
Disease conditions	10	24.4	13	31.7	17	41.5	1	2.4	0	0.0
Disease psycho. Aspects	10	24.4	11	26.8	16	39.0	3	7.3	1	2.4
Lab tests & radiations	19	46.3	19	46.3	2	4.9	1	2.4	0	0.0
About treatment	19	46.3	20	48.8	2	4.9	0	0.0	0	0.0
About drugs	19	46.3	21	51.2	1	2.4	0	0.0	0	0.0
Medical knowledge	14	34.1	16	39.0	5	12.2	2	4.9	4	9.8
Population statistics	3	7.3	9	22.0	11	26.8	8	19.5	10	24.4
Referral information	9	22.0	7	17.1	15	36.6	7	17.1	3	7.3
New Med. Equips.	16	39.0	13	31.7	8	19.5	2	4.9	2	4.9

The table demonstrates that information about drugs is the first highly important information. It is identified by 40 (97.56%) out of 41 of rural doctors as 'very high' to 'highly important'. followed by information about diagnosis and treatment with 39 (95.12%) of rural doctors for each of them, then information about lab tests and radiations which was 38 (92.68%) of the respondents. On the other hand, similarly to urban doctors population statistics is the least important information, as it is chosen by 29 (70.73%) of doctors to be important between 'to some extent' to 'very low', followed by referral information with 25 (60.97%) of the doctors. Figure (4.3) illustrates the different information needs of rural doctors.

Figure (4.3) Rural doctors' indications of 'very high' to 'highly important' of different information



4.3.3 Difference between urban and rural doctors' information needs

To investigate whether there is a difference between urban and rural doctors Chi Square is used as well as Fisher's exact test as there were cells that have an expected count less than 5. Based on Fisher's exact test the results show that there is no evidence of difference between urban and rural doctors with regard to their needs of patient data (P value= 1.000), their needs for information about diagnosis in general (p value= 1.000), needs for information about laboratory tests and radiology (p value= .435), information about treatment (p value= 1.000), drug information (p value= .058),

Similarly Chi square (χ^2) shows no evidence that there is difference between rural and urban doctors regarding their need for information about physical signs and symptoms with p-value (χ^2=.095 DF =1 P=.757), psychological aspects of diseases p-value = (χ^2=2.460 DF=1 P=.117), medical knowledge with p-value (χ^2=894 DF=1 p=.344), referral information p-value = (χ^2=2.432 DF=1 P=.119) and information about new medical equipments p-value = (χ^2=.796 DF=1 P=.372)

However the outcomes still show some differences between urban and rural doctors regarding the importance of different kind of information needs. The chi-square (χ^2) and Fisher's Exact Test are used to evaluate the statistical significance of urban and rural information needs.

One of the differences is regarding information about disease condition. The results show that there is a highly significant difference with p-value (χ^2=10.839 DF=1 and P= .001). Looking at table (4.6) it suggests that a larger proportion of urban doctors need information about disease condition than do rural doctors. It is indicated as 'highly needed' by 80% of urban doctors; on the other hand it is indicated as 'highly needed' by only 56% of rural doctors.

Table (4.6) Rural and urban doctors' degree of importance of disease condition

Area	Disease Condition		
	High importance	Low importance	Total
Urban	172	43	215
Rural	23	18	41
Total	195	61	256

It is not only disease condition information that shows a difference between urban and rural doctors but also the results (as shown in table 4.7) demonstrate that there is evidence that urban doctors need population statistics more than rural doctors with p-value (χ^2= 4.229 DF=1 and P= .040).

Table (4.7) Rural and urban doctors' degree of importance of population statistics

Area	Population statistics		
	High importance	Low importance	Total
Urban	34	181	215
Rural	12	29	41
Total	46	210	256

4.3.4 Information needs and speciality

As a result of too many cells with frequencies less than 5, a quantitative statistic (namely percentage) is applied to describe urban and rural information needs based on their speciality. A breakdown of information needs by speciality is demonstrated in table (4.8) for urban doctors and table (4.9) for rural doctors.

It can be seen from table (4.8) that the most highly important information for different groups of urban doctors are diagnosis, treatment, laboratory tests and radiology, drugs information and patient data. They were indicated with high importance by more than two thirds of doctors in each group. Population statistics and referral information were the least important information for all the groups.

As for rural doctors it can be seen from table (4.9) that rural doctors also highly need patient data, diagnosis information, laboratory tests and radiology, treatment and drug information. As before, population statistics and referral information are the least important information.

Therefore, according to tables (4.8) and (4.9), it can be concluded that there is no significant difference in information needs between urban and rural doctors based on their speciality.

Table (4.8) Urban doctors' information needs based on their speciality

Speciality	Information importance																							
	Patient data		Diagnosis		Signs & symptoms		Disease condition		Psych. Aspects		Lab & radiology		Treatment		Drugs		Med. knowledge		Population Statistics		Referral		New med equipment	
	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
General Medicine	70	6	73	3	61	15	67	9	49	27	72	4	72	4	70	6	59	17	14	62	21	55	56	20
Gynaecologists	27	0	27	0	17	10	21	6	18	9	18	9	26	1	20	7	17	10	6	21	7	20	24	3
Pediatricians	18	5	23	0	17	6	18	5	14	9	22	1	23	0	21	2	13	10	1	22	5	18	21	2
Dermatologists	14	3	17	0	14	3	14	3	14	3	12	5	16	1	16	1	10	7	3	14	7	10	10	7
Surgeons	43	7	42	8	31	19	34	16	31	19	41	9	43	7	40	10	30	20	7	43	14	36	39	11
Anesthesiologists	2	0	2	0	2	0	2	0	1	1	2	0	2	0	2	0	2	0	1	1	1	1	2	0
GPs	19	1	18	2	10	10	16	4	11	9	20	0	18	2	18	2	10	10	2	18	3	17	14	6

H= High importance & L= Low importance

Table (4.9) Rural doctors' information needs based on their speciality

speciality	Information importance																							
	Patient data		Diagnosis		Signs & symptoms		Disease condition		Psych. Aspects		Lab & radiology		Treatment		Drugs		Med. knowledge		Population Statistics		Referral		New med equipment	
	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
General Medicine	19	2	19	2	13	8	10	11	13	8	19	2	21	0	21	0	14	7	6	15	8	13	12	9
Gynaecologists	1	0	1	0	0	1	0	1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
Pediatricians	4	0	4	0	3	1	4	0	0	4	4	0	4	0	4	0	3	1	1	3	1	3	3	1
Dermatologists	1	0	1	0	0	1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
Surgeons	5	1	6	0	4	2	3	3	2	4	5	1	5	1	6	0	5	1	0	6	1	5	5	1
Anesthesiologists	2	1	3	0	3	0	1	2	1	2	3	0	3	0	3	0	2	1	1	2	2	1	3	0
GPs	5	0	5	0	5	0	4	1	3	2	5	0	4	1	4	1	4	1	2	3	2	3	4	1

H= High importance & L= Low importance

4.3.5 Information needs and professional degree (career grade)

From table (4.10) it can be inferred that SHOs, specialists and consultants have approximately the same information needs, since the largest proportion of each group indicates high importance for the same kind of information needs as the other groups, as well as the largest proportion of each group indicating low importance for the same kind of information needs as the other groups.

However some differences can be seen from table (4.10). First the proportion of consultants (43%) who indicated high importance for population statistics is much bigger than SHOs (16%) and specialists (19%). Second, the percentage of SHOs (63%) that chose high importance for medical knowledge is somewhat lower than specialists (79%) and consultants (79%). Third, consultants are more concerned with referral information than specialist and SHOs doctors, whereas (43%) of the consultants, indicate high importance of referral information; only (28%) of the SHOs and (30%) of the specialists select high importance for such information.

Table (4.10) Doctors' information needs based on their professional degree

Professional degree	Information importance																							
	Patient data		Diagnosis		Signs & symptoms		Disease condition		Psych. Aspects		Lab & radiology		Treatment		Drugs		Med. knowledge		Population Statistics		Referral		New med equipment	
	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
SHOs	177	18	187	8	135	60	151	44	114	81	172	23	185	10	172	23	123	72	31	164	54	141	146	49
Specialists	42	5	42	5	35	12	34	13	34	13	42	5	41	6	42	5	37	10	9	38	14	33	40	7
Consultants	11	3	12	2	10	4	10	4	11	3	11	3	13	1	13	1	11	3	6	8	6	8	9	5

H= High importance & L= Low importance

4.3.6 Information needs and occupation

With regard to involvement in other professions, statistical analysis using chi square and Fisher's exact test shows no evidence that participation in research work and further study might influence doctors' information needs, as p-value for research with all kinds of information ranged between 0.112 to 0.869 and ranged between .085 and .972 for further study and all kinds of information needs which means that p-value is > α .05 and statistically not significant. Likewise, participation in management professions does not appear to have an influence on doctors' information needs. However Fisher's exact test shows that the p-value ranged between 0.117 and 1.000 which is not significant either.

However, that was not the case with doctors who were involved in the teaching profession. The results indicate that there is statistical evidence that there is a difference between doctors involved in the teaching profession and those who are not, regarding their information need on the psychological aspects of diseases with p-value (χ^2= 6.020 DF=1 and P= .014), their information need of medical knowledge with p-value (χ^2= 5.106 DF=1 and P= .024) and their need of population statistics with p-value (χ^2= 5.325 DF=1 and P= .024).

Looking at table (4.11) it suggests that a larger proportion (75.40%) of the doctors engaged in teaching professions need such kinds of information than do doctors who are not involved in teaching (57.94%).

Table (4.11) Degree of importance of information about psychological aspects of diseases based on involvement in teaching

Involvement in teaching	Psychological aspects of diseases		
	High importance	Low importance	Total
Doctors involved	46	15	61
Doctors not involved	113	82	195
Total	159	97	256

In addition, the results from Table (4.12) show that a larger proportion (78.68%) of those that have teaching responsibility need medical knowledge than those that do not have teaching responsibility (63.07%).

Table (4.12) Degree of importance of medical knowledge, based on involvement in teaching

Involvement in teaching	Medical knowledge		
	High importance	Low importance	Total
Doctors involved	48	13	61
Doctors not involved	123	72	195
Total	171	85	256

Table (4.13) Degree of importance of population statistics based on involvement in teaching

Involvement in teaching	Population statistics		
	High importance	Low importance	Total
Doctors involved	17	44	61
Doctors not involved	29	166	195
Total	46	210	256

Based on table (4.13) it indicates that doctors involved in the teaching profession need more information about population statistics than doctors who do not do a teaching job, whereas the proportion of those involved is (27.86%) and the proportion of those not involved is (14.87%).

4.3.7 Information needs and age

Statistical analysis was conducted using chi square and Fisher's exact test to evaluate whether there is a statistically significant difference in doctors' information needs based on their age. First doctors were classified into two groups, one 39 years old or less, and the other 40 years or older.

The results show that there is no evidence of a difference between doctors' information needs based on their age with regard to their needs for patient data with p-value (χ^2=.722 DF =1 P=.396), their needs for information about disease conditions with p-value (χ^2=.000 DF =1 P=.991), their needs for information about lab tests and radiology with p-value (χ^2=.235 DF =1 P=.628), drugs information with p-value (χ^2=1.350 DF =1 P=.245). Also the results demonstrate that there is no evidence of difference between older and younger doctors in relation to their need for information about new medical equipment with p-value (χ^2=1.751 DF =1 P=.186)

Similarly, Fisher's exact test values demonstrate that there is no evidence of difference between older and younger doctors regarding their needs for information about diagnosis (p value= .230) and their need for information about treatment (p value= .396).

However, the statistical analysis highlights some significant results. First there is statistical evidence that there is a difference between older and younger doctors based on their age concerning their needs for information about physical signs and symptoms with p-value (χ^2=6.030 DF =1 P=.014). Looking at table (4.14) it suggests a larger proportion of older doctors need information about physical signs and symptoms than younger doctors.

Table (4.14) Younger and older doctors' degree of importance of physical signs and symptoms

Age	Physical signs and symptoms		
	High importance	Low importance	Total
Younger doctors	125	64	189
Older doctors	55	12	67
Total	180	76	256

There is highly significant evidence that there is a difference between young and older doctors regarding their needs for information about psychological aspects of diseases with p-value (χ^2=13.180 DF =1 P=.000). It can be seen from table (4.15) that there is larger proportion of older doctors who need information about psychological aspects of diseases than younger doctors.

Table (4.15) Younger and older doctors' degree of importance of psychological aspects of diseases

Age	Psychological aspects of diseases		
	High importance	Low importance	Total
Younger doctors	105	84	189
Older doctors	54	13	67
Total	159	97	256

It is evident that there is a difference between younger and older doctors in respect of their needs for medical knowledge with p-value (χ^2=4.786 DF =1 P=.029). Table (4.16) shows more older doctors indicated medical knowledge as highly needed than younger doctors, with (77.61%) and (62.96%) respectively.

Table (4.16) Younger and older doctors' degree of importance of medical knowledge

Age	Medical knowledge		
	High importance	Low importance	Total
Younger doctors	119	70	189
Older doctors	52	15	67
Total	171	85	256

There is a highly significant difference between the age groups concerning their need for population statistics with p-value (χ^2=13.608 DF =1 P=.000). According to table (4.17) there is a larger number of older doctors who highly need population statistics than younger doctors.

Table (4.17) Young and older doctors' degree of importance of population statistics

Age	Population statistics		
	High importance	Low importance	Total
Younger doctors	119	70	189
Older doctors	52	15	67
Total	171	85	256

There is evidence of a difference regarding referral information between older and younger doctors with p-value (χ^2=4.328 DF =1 P=.037). The difference can be seen from table (4.18) as a larger proportion of the former indicated that referral information is highly needed than the latter.

Table (4.18) Young and older doctors' degree of importance of referral information

Age	Referral information		
	High importance	Low importance	Total
Younger doctors	48	141	189
Older doctors	26	41	67
Total	74	182	256

4.3.8 Information needs and gender

According to the outcomes of the study it seems that gender has some influence on doctors' information needs. Statistical analysis shows that there is evidence that male doctors differ from female doctors regarding their needs for patient data with p-value (χ^2=6.582 DF= 1 P=.010). The results show that a larger proportion of female doctors (95%) need patient data than male doctors (85%). Also it is evident that they differ concerning diagnosis information with p-value (χ^2=7.199 DF= 1 P=.007). It appears that female doctors more highly need

diagnosis information than male doctors. While it is indicated with high importance by (98%) of female doctors, it is indicated high importance by (90%). There is a difference with population statistics as well, the p-value = (χ^2=4.583 DF= 1 P=.032). The results show that a larger proportion of male doctors approximately (23%) reported population statistics with high importance than did female doctors (12%).

4.3.9 Drivers for information needs

It is assumed that different information is used for different purposes, and different purposes may influence information needs. For this study doctors were asked to identify purposes for which their information needs arise.

4.3.9.1 Driving purposes of urban doctors' information needs

Table (4.19) Urban doctors' purposes for using different information

purposes / Information	To be up to date	Patient care	Education purpose	To write research paper	Answer patients'/ families' questions	Answer colleagues' questions
Patient data	86	190	66	46	89	45
	40.5%	88.4%	30.7%	21.4%	41.4%	20.9%
About diagnosis	90	197	94	40	75	46
	41.9%	91.6%	43.7%	18.6%	34.9%	21.4%
Physical signs and symptoms	71	156	70	27	45	35
	33.0%	72.6%	32.0%	12.6%	20.9%	16.3%
Disease conditions	43	172	72	45	67	30
	20.0%	80.0%	33.5%	20.9%	31.2%	14.0%
Disease psycho. aspects	95	177	40	27	67	19
	44.2%	82.3%	18.6%	12.6%	31.2%	8.8%
Lab tests & Radiology	99	178	80	41	73	43
	46.0%	82.8%	37.2%	19.1%	34.0%	20.0%
About treatment	99	184	79	50	58	41
	46.0%	85.6%	36.7%	23.3%	27.0%	19.1%
About drugs	99	160	81	40	49	32
	46.0%	74.4%	37.7%	18.6%	22.8%	14.9%
Medical knowledge	133	123	94	74	38	31
	61.9%	57.2%	43.7%	34.4%	17.7%	14.4%
Population statistics	65	39	61	59	22	18
	30.2%	18.1%	28.4%	27.4%	10.2%	8.4%
Referral information	49	71	31	23	32	28
	22.8%	33.0%	14.4%	10.7%	14.9%	13.0%
New Med. Equip.	116	137	67	29	24	29
	54.0%	63.7%	31.2%	13.5%	11.2%	13.5%

As can be seen from Table (4.19), urban doctors need information to be up to date, for patient care, for education purposes, to write research papers, and to answer patients' and their family questions or to answer colleagues' questions. It is almost certain that the main purpose for using the different kinds of information is to provide patient care and to be up to date. Furthermore, the most common kind of information that the large proportion of doctors use to provide patient care is general information about diagnosis, patient data, treatment, lab tests and radiology, disease psychological aspects and disease conditions.

However, from the table it can be estimated that apart from patient care and being up to date not all kinds of information are equally used for all purposes. For instance, patient data are more heavily used to answer patient and their families' questions than other kinds of information. Diagnosis information and general medical knowledge are more likely to be for education purposes than other kinds of information. In order to answer their colleagues' questions, urban doctors are more likely to need general information about diagnosis, laboratory tests and radiology and patient data, and they hardly use information about the disease psychological aspects or population statistics to answer colleagues' questions.

4.3.9.2 Driving purposes of rural doctors' information needs

Regarding rural doctors table (4.20) shows the number and percent of doctors' use of different kinds of information for different purposes.

Table (4.20) Rural doctors' purposes for using different kinds of information

purposes / Information	To be up to date	Patient care	Education purpose	To write research paper	Answer patients'/ families' questions	Answer colleagues' questions
About patient data	10	37	7	4	14	8
	24.4%	90.2%	17.1%	9.8%	34.1%	19.5%
About diagnosis	14	28	14	5	13	10
	34.1%	68.3%	34.1%	12.2%	31.7%	24.4%
Physical signs and symptoms	14	32	14	4	9	5
	34.1%	78.0%	34.1%	9.8%	22.0%	12.2%
Disease conditions	12	29	13	9	11	5
	29.3%	70.7%	31.7%	22.0%	26.8%	12.2%
Disease psycho. aspects	9	38	8	5	12	3
	22.0%	92.7%	19.5%	12.2%	29.3%	7.3%
Lab tests & Radiology	16	38	14	8	9	7
	39.0%	92.7%	34.1%	19.5%	22.0%	17.1%
About treatment	18	33	8	7	9	8
	43.9%	80.5%	19.5%	17.1%	22.0%	19.5%
About drugs	20	31	11	3	4	6
	48.8%	75.6%	26.8%	7.3%	9.8%	14.6%
Medical knowledge	19	20	16	9	6	11
	46.3%	48.8%	39.0%	22.0%	14.6%	26.8%
Population statistics	10	9	17	14	3	3
	24.4%	22.0%	41.5%	34.1%	7.3%	7.3%
Referral information	8	23	9	9	7	6
	19.5%	56.1%	22.0%	22.0%	17.1%	14.6%
New Med. Equip.	12	30	16	6	4	3
	29.3%	73.2%	39.0%	14.6%	9.8%	7.3%

According to table (4.20) patient care is by far the most common purpose for which rural doctors use the different kinds of information. The most heavily used kinds of information for the purpose of patient care are: general information about laboratory tests and radiology; psychological aspects of disease; patient data and treatment. To answer their colleagues' questions rural doctors are more likely to use general medical knowledge and diagnostic information than other kinds of information. For the purpose of being up to date they use drug information, medical knowledge and general information about treatment more than the other kinds of information.

4.3.9.3 Differences in information need drivers of urban and rural doctors

To investigate whether there is evidence of a difference between urban and rural doctors regarding the purposes for which they use the different kinds of information, chi square and Fisher's exact test are used for the statistical analysis.

Table (4.21) P-value of urban and rural doctors' purposes for using different information

purposes / Information	To be up to date	For Patient care	For Education purpose	To write research paper	Answer patients'/ families' questions	Answer colleagues' questions
Patient data	-	1.000	.085	.077	.386	-
About diagnosis	.357	.762	.323	.255	.695	.671
Physical signs and symptoms	.889	.578	.796	.843	.883	.509
Disease conditions	.559	.776	.883	.824	.581	.764
Disease psycho. aspects	.776	.086	.949	.891	.810	1.000
Lab tests & Radiology	.541	.110	.947	.709	.131	.665
About treatment	.801	.406	.383	.033	.502	.947
About drugs	.748	.872	.076	.185	.059	.967
Medical knowledge	.064	.319	.118	.578	.636	.049
Population statistics	.451	.567	.384	.095	.776	1.000
Referral information	.644	.005	.046	.223	.721	.781
New Med. Equip.	.004	.244	.845	.324	1.000	.274

As can be seen from table (4.21), there is statistical evidence that there is a difference between urban and rural doctors concerning their use of treatment information to write research papers, p-value (χ^2=4.558 DF =1 P=.033), and their use of medical knowledge to answer colleague questions (χ^2=3.867 DF =1

P=.049). Also from the results, it appears that urban is not exactly the same as rural regarding their use of referral information for care of patient with p-value (χ^2=7.890 DF =1 P=.005) and their use of referral information for education purposes with p-value (χ^2=3.987 DF =1 P=.046). Urban and rural doctors are dissimilar in their use of information about new medical equipment to be up to date with p-value (χ^2=8.393 DF =1 P=.004).

According to the results, they suggest that a larger proportion of urban doctors (36.74%) use general information about treatment for the purpose of writing research papers than do their counterparts (19.51%). Rural doctors (26.82%) use medical knowledge to answer colleagues' questions more than urban doctors (14.41%). Also a larger proportion of rural doctors (56.09%) use referral information to provide health care to patients than do urban doctors (33.02%) and a larger proportion of the rural (21.95%) involve the use of referral information in education than urban doctors (10.69%). Concerning the use of information about new medical equipments for the purpose of being up to date, the outcomes suggest that urban doctors (53.95%) use it more than rural doctors (29.26%).

From these results it can be concluded that urban and rural doctors are not exactly the same in all the purposes for which they use the different kinds of information.

4.4 Summary

Data in this chapter show that information about diagnosis, drug, treatment and patient data were indicated highly important by both urban and rural doctors. On the other hand population statistics and referral information were the less important information for both of urban and rural doctors. However, data demonstrated that there was a statistical difference between old and young doctors regarding their needs for information about physical signs and symptoms; psychological aspects of disease; medical knowledge; population statistics and referral information. Data suggested that higher proportion of old doctors needed such information than did young doctors. Also it can be seen from data in this

chapter that the main driving purposes of doctors' information needs were to be up to date; answering patient/family and colleagues' questions and to write research paper.

Chapter five Quantitative results regarding information seeking

5.1 Introduction

It could be argued that the quality of health care is affected by access to particular information about a patient and accessing information for the purpose of increasing and enhancing medical knowledge in general. Based on doctors' need for information to care for patients and the need to develop their medical knowledge doctors' information needs arise, and different information channels and sources are used by them to meet their needs. This chapter analyses doctors' information seeking behaviour in order to provide further propositions to support doctors in the context of patient care.

5.2 Use of information channels

5.2.1 Urban doctors' channels of accessing information

According to the results, urban doctors are fulfilling some portion of their information needs through a diversity of channels. The first information channel that was used by urban doctors to access information was the personal library (77 doctors 35.8%), then colleagues (59 doctors 27.4%), followed by the internet (47 doctors 21.9%), after that hospital library (13 doctors 6.0%) and finally the medical faculty library (4 doctors 1.9%).

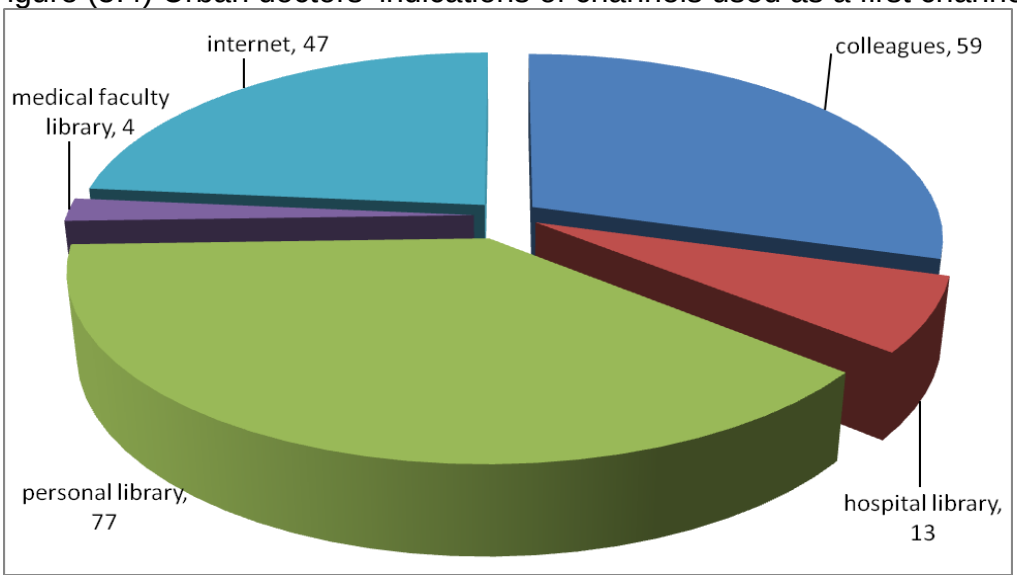
Table (5.22) Urban doctors' order of using different channels

Order / Channel	1	2	3	4	5	No answer	Total
Colleagues	59	29	45	24	36	22	215
Hospital library	13	42	27	66	36	31	215
Personal library	77	50	30	19	14	25	215
Medical faculty library	4	22	33	43	76	37	215
The internet	47	53	51	24	12	28	215

Table (5.22) shows that the medical faculty library and hospital library are the least used channels by urban doctors to access information. Data suggest more urban doctors (55.35%) tend to use the medical faculty library as a last choice than first choice (12.09%). In addition, 47.44% of them use the hospital library as

the fourth or the fifth source compared to 25.58% who use it as the first or the second channel to access information. On the other hand, personal library, colleagues and the internet are the top channels used to access professional information. Figure (5.4) shows the use of different channels as the first channel by urban doctors.

Figure (5.4) Urban doctors' indications of channels used as a first channel



5.2.2 Rural doctors channels of accessing information

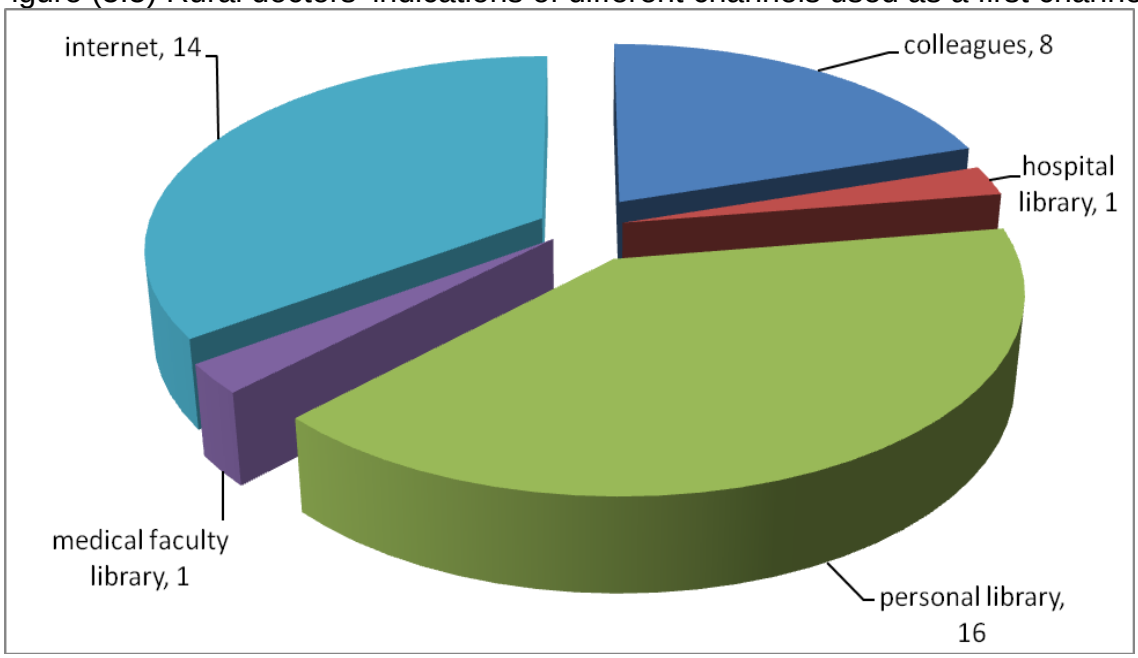
Rural doctors use a variety of channels to meet their information needs. The first source they use to satisfy their needs is their personal library with 16 (39.0%) of doctors, secondly the internet with 14 (34.1%), after that colleagues with 8 (19.5%), finally the hospital library and medical faculty library equally with 1 doctor for each of them.

Table (5.23) Rural doctors' rank of using different channels

rank / Channel	1	2	3	4	5	No answer	Total
Colleagues	8	10	11	3	6	3	41
Hospital library	1	0	5	14	10	11	41
Personal library	16	17	3	3	1	1	41
Medical faculty library	1	3	6	11	13	7	41
The internet	14	11	12	1	1	2	41

Looking at the data in table (5.23) it can be seen that using the personal library and the internet are not exactly the same as the other channels. The hospital library and medical faculty libraries are the least used channels to access information. A larger proportion of rural doctors (58.54%) indicated that they use the hospital library as the last channel to be consulted and the same percent use medical faculty library as the fourth or fifth channels to access information as well. By contrast, a personal library is indicated as first or second channels to access information by a large percentage of rural doctors (80.45%), as well as the internet with (60.98%) and colleagues with (43.90%). Figure (5.5) shows the usage of different channels as the first channel by rural doctors.

Figure (5.5) Rural doctors' indications of different channels used as a first channel



5.2.3 Difference between urban and rural doctors in using information channels

Although the results of urban and rural doctors' use of different channels show that both urban and rural doctors use their own libraries and the internet to acquire professional information more than the professional libraries, the analysis demonstrates some differences with reference to their use of a hospital library.

The study indicates that there is a significant difference between urban and rural doctors regarding their usage of a hospital library to acquire work related information, p-value= (χ^2=9.665 DF =2 P=.008).

Table (5.24) suggests that urban doctors use hospital libraries more than rural doctors do. Data show that while a larger ratio (29.9%) of urban doctors reported using a hospital library as a first or second channel to access information, a larger proportion (80%) of rural doctors indicated that they use it as a fourth or fifth channel when searching professional information.

Table (5.24) Urban and rural doctors' rank of use of hospital library

Rank / Area	Hospital library rank			
	1-2	3	4-5	Total
Urban	55	27	102	184
Rural	1	5	24	30
Total	56	32	126	214

5.2.4 Importance of different channels

As the frequent use might be an indication of the importance of the different channels, doctors were asked to identify how frequently they use the different channels. Doctors were asked to indicate their frequent use on a daily, weekly, every 2 weeks and monthly base or every more than month.

5.2.4.1 Urban doctors' different channels' frequency use

The results in Table (5.25) show that the most frequently used channel is personal contacts with colleagues and more experienced people, as human sources are used on a daily basis by approximately more than two thirds of urban doctors with (71.62%). After that the use of the internet, as it is used on a daily or weekly basis by a larger proportion (72.55%) of the respondents. On the other hand the medical faculty library is the least frequently used with the high frequency of both monthly use with (39.53%) and every more than month (41.39%).

Although hospital libraries and a medical faculty library are not used as frequently as the internet and personal contacts, 36.7% of urban doctors indicate that they are satisfied with the information services of the hospital library and 37.7% are satisfied with the information services of the medical faculty library.

Table (5.25) Urban doctors' frequency of use the different channels

Frequency of use / Channels	Daily	Weekly	Fortnight	Monthly	Every more than month	Total
Hospital library	18	56	25	59	57	215
Medical faculty library	4	12	25	85	89	215
Colleagues	154	24	9	18	10	215
The internet	89	67	23	27	9	215

When the frequent use of the different channels is compared to the professional degree of urban doctors, the results indicated that while more than half of the SHOs (54.60%) and the specialists (53.66%) tend to use the hospital library less frequently (monthly or every more than month), a larger proportion (54.55%) of the consultants use it more on a daily or weekly basis. Similarly, for

the medical faculty library, a larger proportion (27.27%) of the consultants uses it more frequently than do SHOs (7.36%) and specialists (2.44%). Although the results show that a large proportion (69.33%) of SHOs and specialists (80.49%) use the internet on a daily or weekly basis, still it is used more frequently by a larger proportion of consultants (90.91%). On the other hand, SHOs and specialists use personal contacts more frequently than do consultants. Data show that while a large proportion of SHOs (87.73%) and specialists (75.61%) use their colleagues on a daily or weekly basis to meet their professional information needs, a smaller proportion (36.36%) of consultants use their colleagues frequently.

5.2.4.2 Rural doctors' different channels frequent use

The results displayed in table (5.26) show that the most frequently used channel on a daily basis is the personal contacts with colleagues. Human sources are used on a daily basis by 39.02%, followed by the use of the internet, as it is used on daily base by 34.15% of the respondents. On the other hand, the hospital library is the least frequently used channel with high frequency of use on the basis of every more than month (58.54%). What is more, when rural doctors were asked to indicate their satisfaction with hospital library services, 63.41% of them expressed that they are unsatisfied. With reference to the medical faculty library, although a large proportion of rural doctors (39.02%) feel dissatisfied with its information services, it is still much lower compared to the proportion who dissatisfied with hospital library services.

Table (5.26) Rural doctors' frequency of use of the different channels

Frequency of use / Channels	Daily	Weekly	Fortnight	Monthly	Every more than month	Total
Hospital library	1	3	5	8	24	41
Medical faculty library	1	4	2	15	19	41
Colleagues	16	8	8	5	4	41
The internet	14	17	4	4	2	41

With reference to the frequent use based on the doctors' professional degree (career grade), the study reveals that specialists do not use hospital and medical

faculty libraries on a daily or weekly basis. However, a few SHOs, (three out of thirty-two), and consultants (one out of three) use the hospital library on a daily or weekly basis. In addition, data suggest that consultants (66.67%) use the medical faculty library on a daily or weekly basis more than do SHOs (9.38%) and specialists who reported not using them on a daily or weekly basis. Concerning using personal contacts the data demonstrate that while 68.75% of SHOs and 33.33% of specialists use their colleagues on a daily or weekly basis, none of the consultants reported asking for information from their colleagues on a daily or weekly basis. As for the frequent use of the internet, the outcomes show that a larger proportion of specialists (83.33%) use the internet on a daily or weekly basis compared to 78.13% of SHOs and 33.33% of the consultants.

5.2.4.3 Difference between urban and rural doctors in frequency of use of different channels

The results indicate that rural doctors are almost the same as urban doctors with reference to their use of the internet to access professional information. The study shows that there is a tendency for both urban and rural doctors to use the internet more frequently (daily to weekly) than other sources. As for the frequent use of the medical faculty library to access professional information, although statistical analysis cannot be conducted due to lack of data (two cells (33.3%) have an expected count less than five), the quantitative analysis suggests that most urban and rural doctors are the same, as the majority of both groups tend to use them less frequently.

However, the study also shows that there is a significant difference between urban and rural doctors regarding their frequent use of a hospital library with p-value (χ^2=10.341 DF =2 P=.006) and colleagues with p-value (χ^2=16.646 DF =2 P=.000) to search for professional information.

Table (5.27) The frequent use of hospital library of urban and rural doctors

Area	Hospital library frequent use			
	Daily or weekly	Fortnight	Monthly or more	Total
Urban	74	25	116	215
Rural	4	5	32	41
Total	78	97	81	256

Looking at table (5.27) it appears that urban doctors use the hospital library more frequently than do rural doctors. The results indicate that while (34.42%) of urban doctors use a hospital library on a daily or weekly basis, only (9.76%) of rural doctors use the hospital library on that basis. What is more, table (27) demonstrates that more rural doctors (78.05%) than urban doctors (53.95%) use the hospital library on the basis of monthly or every more than month.

With regard to accessing professional information using human contacts with colleagues and professional experts, the study reveals that urban doctors access patient care information through personal contacts much more frequently than do rural doctors. Table (5.28) shows that while 82.79% of the urban doctors use personal contacts on a daily or weekly basis, only 58.54% of rural doctors access information through their colleagues on a daily or weekly basis.

Table (5.28) The frequent use of personal contacts of urban and rural doctors

Area	Personal contacts frequent use			
	Daily or weekly	Fortnight	Monthly or more	Total
Urban	178	9	28	215
Rural	24	8	9	41
Total	202	40	14	256

5.2.5 Ease of use of different channels

To investigate whether the use and importance of different information channels is linked to the ease of access, doctors were asked to indicate how easy it was to access the different channels.

5.2.5.1 Urban doctors' indications of ease of use of different channels

It would appear from the data in table (5.29) that personal contacts were the easiest channel to access information, as it is indicated as 'very easy' to 'easy' by (90.23%) of urban doctors, followed by the internet with 82.32% of urban doctors. In contrast the medical faculty library is indicated by a larger proportion (31.16%) of urban doctors to be more 'difficult' to 'very difficult' to access than any other channels.

Table (5.29) Urban doctors' indication of ease of use of different channels

Ease to access / Channel	V. easy	Easy	To some extent	Difficult	V. difficult
Hospital library	96	50	35	16	18
Med. faculty library	35	45	68	38	29
Colleagues	164	30	13	6	2
Internet	116	61	26	8	4

To investigate whether the ease of access influences urban doctors' frequent use of different channels, table (5.30) shows the ease and difficulty of access and the frequent use of the different channels.

Table (5.30) Urban doctors' level of access and use of different channels

Levels / Channels	Level of access		Level of use	
	Easy	Difficult	More frequently	Less frequently
Hospital library	84.19%	15.81%	46.05%	53.95%
Medical faculty library	68.84%	31.16%	19.07%	80.93%
Colleagues	96.28%	3.72%	86.98%	13.02%
The internet	94.42%	5.58%	83.26%	16.74%

It can be seen from the table (5.30) the ease of access to the hospital library is not translated into more frequent use, whereas a larger proportion (84.19%) of urban doctors indicated that it is easy to access hospital library, but a larger proportion (53.95%) of them show less frequent use of the hospital library. As for the medical faculty library, the ease of access does not have an impact on the level of its use. The results reveal that while a large proportion (80.93%) less frequently use the medical faculty library, a large proportion (68.84%) indicates it is easy to access.

However that is not the case with colleagues and the internet, where the data show that the ease of access is possibly linked to more frequent use. With reference to the level of access to colleagues, a larger proportion (96.28%) state that it is easy to access them, also a larger proportion (86.98%) demonstrates that colleagues are more frequently used. A larger proportion (94.42%) shows that the internet is easy to access, and a smaller proportion (16.74%) reveals less frequent use of the internet compared to more frequent use with (83.26%).

5.2.5.2 Rural doctors' indications of ease of use of different channels

Table (5.31) Rural doctors' indication of ease of use of different channels

Ease to access / Channel	V. easy	Easy	To some extent	Difficult	V. difficult
Hospital library	14	6	3	2	16
Med. faculty library	5	14	9	4	9
Colleagues	23	12	6	0	0
Internet	18	16	6	1	0

Data from table (5.31) indicate that while personal contacts are the easiest channel that can be accessed; the hospital library is more difficult than other channels. However, although the hospital library is indicated as very difficult for access compared to other channels, it is still easier than the medical faculty library. This contradiction might be due to the lack of a hospital library in some rural hospitals, therefore it raises the percent of the nearest medical faculty library.

Table (5.32) shows that rural doctors are almost the same as urban doctors with reference to the influence of ease of access upon the frequent use of different channels. The data demonstrate that frequent use of a hospital library and medical faculty library is not influenced by the ease of access. On the other hand, the ease of access has an impact on the frequent use of colleagues and the internet. A large proportion of rural doctors point out that it is easy to access colleagues and the internet. They are more frequently used than the other channels.

Table (5.32) Rural doctors' level of access and use of different channels

Levels / Channels	Level of access		Level of use	
	Easy	Difficult	More frequently	Less frequently
Hospital library	56.09%	43.90%	21.95%	78.05%
Medical faculty library	68.29%	31.71%	17.07	82.93%
Colleagues	100%	0.0%	78.05%	21.95%
The internet	97.56%	2.44%	85.37%	14.63%

5.3 Use of information sources

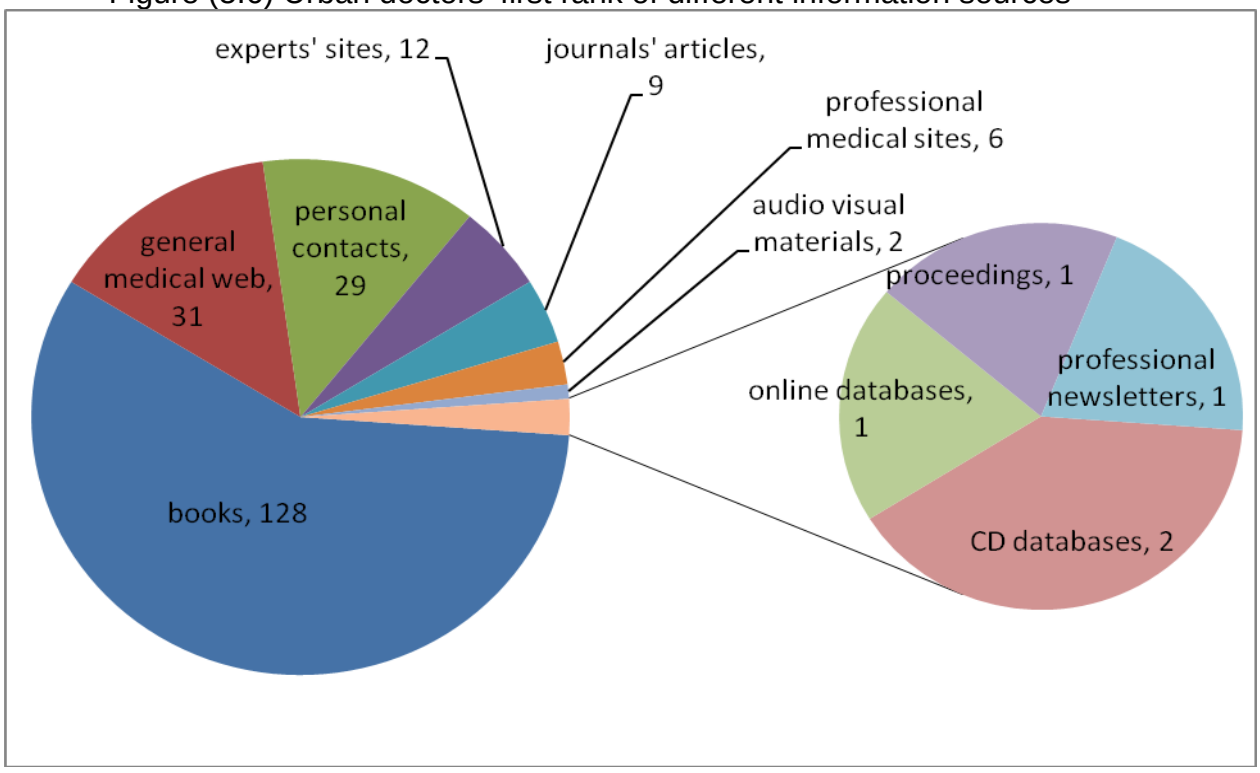
Several sources of medical information are likely to support doctors' information needs. These include paper and electronic based sources and personal contacts. In order to investigate what sources are used first to meet doctors' information needs, in this study respondents were offered eleven kinds of information sources, and they were asked to rank these sources based on their actual use.

5.3.1 Rank of information sources

5.3.1.1 Urban doctors' ranking of information sources

Overall the top sources of information for urban doctors are: books 128 (59.5%), general medical websites 31 (14.4%), personal contacts 29 (13.5%), experts' websites 12 (5.6%), journal articles 9 (4.2%), professional medical websites 6 (2.8%), audio visual materials 2 (0.9%), CD databases 2 (0.9%), online databases 1(0.5%), proceedings 1 (0.5%), and professional newsletters 1 (0.5%). Although the use of electronic sources to fulfil information needs is becoming omnipresent, urban doctors rely much more heavily on books compared to the other electronic sources.

Figure (5.6) Urban doctors' first rank of different information sources



It can be seen from Figure (5.6) that books, general medical websites and the personal contacts with colleagues and professional experts are by far the most consulted as first sources by urban doctors. On the other hand, online databases, proceedings, professional newsletters, CD databases and audio visual materials are the least likely to be consulted as first sources when information needs arise. Furthermore, online databases ranked the last source to be consulted by more than a quarter of urban doctors (27.0%).

5.3.1.2 Rural doctors' ranking of information sources

Data shows that (73.2%) of rural doctors use books as the first sources to fulfil their information needs, followed by searching general medical websites with (14.6%), after that personal contacts with colleagues and medical experts with (12.2%). On the other hand, it is unlikely that rural doctors consult online databases as a first source, none of the doctors rank it between the first fifth choices, moreover the majority of them (41.5%) have ranked them as the last source to be consulted.

5.3.1.3 Difference between urban and rural doctors regarding information sources ranking

It appears from the data that urban and rural doctors are almost the same in reference to their usage of books as a first source to be consulted, and the second source is general medical websites followed by consulting human resources. In addition, they are more or less the same in their lower use of online databases.

5.3.2 Characteristics that may have an impact on using information sources

It appears that there are several factors influenced using different information sources. Doctors were asked to indicate what characteristics they think may influence using information sources.

5.3.2.1 Urban doctors' indication of source characteristics

Data in table (5.33) indicate that urban doctors have a tendency to consider availability an important characteristic that may influence the use of different information sources, as it is reported by more than half of the respondents. Direct access, credibility and ease of use characteristics differ from one source to another.

Table (5.33) Urban doctors' perception of the characteristics that may influence source use

Characteristics / Sources	Availability	Instant access	Credibility	Ease of use
Books	166	102	108	117
Journal articles	113	146	118	38
Proceedings	102	67	151	30
Professional newsletters	103	52	76	36
Personal contacts	121	109	70	60
Audio-visual materials	107	53	148	91
Online databases	105	60	53	144
CD-Rom databases	124	60	148	92
General medical websites	132	94	73	111
Experts' websites	125	141	94	132
Professional organisation websites	124	135	76	148

Instant access is reported by a large proportion with journal articles (67.90%), specialists' websites (65.58%), professional organisation websites (62.79%) and personal contacts (50.69%). On the other hand, it is less important with professional newsletters (24.18%) and audio visual materials (24.65%). Credibility has much more influence on the use of proceedings (70.23%), audio visual

materials (68.83%) as well as CD databases with (68.83%) than other kinds of sources. Urban doctors believe that online databases, experts' websites, professional organisation websites, general medical websites are by far the most influenced by ease of use.

5.3.2.2 Rural doctors' indications of source characteristics

With regard to rural doctors table (5.34) presents their indications about the different sources' characteristics. It can be seen from the table that availability of sources is more important for rural doctors than other characteristics. In addition, rural doctors reported books and general medical websites are more affected by level of credibility than other resources. The internet resources use appears to be slightly more affected by ease of use than the other electronic resources. Human resources are influenced more by direct access than other characteristics. On the other hand, audio visual materials are by far the least affected by instant access.

Table (5.34) Rural doctors' perception of the characteristics that may influence source use

Characteristics / Sources	Availability	Instant access	Credibility	Ease of use
Books	32	23	21	28
Journal articles	24	7	15	11
Proceedings	25	10	12	16
Professional newsletters	25	10	9	7
Personal contacts	20	26	14	12
Audio-visual materials	26	4	14	16
Online databases	19	11	10	13
CD-Rom databases	22	14	10	15
General medical websites	27	21	21	23
Experts' websites	23	20	12	12
Professional organisation websites	22	17	12	17

5.3.2.3 Difference between urban and rural doctors indications of source characteristics

Table (5.35) P-value of urban and rural doctors' indications of source characteristics

Characteristics / Sources	Availability	Instant access	Credibility	Ease of use
Books	.906	.310	.908	.100
Journal articles	.482	.000	.032	.172
Proceedings	.112	.386	.000	.000
Professional newsletters	.125	.978	.095	.959
Personal contacts	.376	.135	.843	.859
Audio-visual materials	.109	.036	.000	.695
Online databases	.769	.888	.972	.000
CD-Rom databases	.634	.419	.000	.460
General medical websites	.590	.376	.036	.599
Experts' websites	.808	.041	.085	.000
Professional organisation websites	.634	.011	.453	.001

As is shown in table (5.35) statistically urban doctors are not exactly the same as rural doctors concerning their perceptions of the characteristics that influence information sources use. The results show a highly significant difference with p-value (χ^2=37.003 DF =1 P=.000) in reference to instant access to journal articles. Data suggests that a larger proportion of urban doctors (67.9%) than rural doctors (17.07%) do consider direct access to journals an important factor in the use of journals. Also there is a statistical difference in relation to the credibility of journal articles with p-value (χ^2=4.619 DF =1 P=.032). Data demonstrate that rural doctors (36.6%) are less affected by credibility when using journal articles than urban doctors (54.9%). A significant level is also shown with proceedings credibility p-value (χ^2=24.981 DF =1 P=.000) and proceedings ease of use p-value (χ^2=14.683 DF =1 P=.000). According to the data, a larger proportion of urban doctors (70.2%) than rural doctors (29.3%) think that credibility influences proceedings use. As for proceedings ease of use, large percent of rural doctors (39.0%) believe it is an influencing factor compared to 14.0% of urban doctors.

A difference is not only shown with paper based resources but also with electronic resources. The p-value indicates a statistical difference in the context of direct access to audio visual materials (χ^2=4.414 DF =1 P=.036), where a larger proportion (24.7%) of urban doctors reported that audio visual materials are influenced by instant access than rural doctors (9.8%). Also there is difference regarding the impact of credibility on audio visual materials use p-value (χ^2=17.834 DF =1 P=.000). While over two thirds of urban doctors (68.8%) assume credibility has an impact on utilizing audio visual materials, just (34.1%) of rural doctors assume that credibility influences the use of audio visual materials.

In addition it is evident that urban and rural doctors are dissimilar regarding ease of use of online databases p-value (χ^2=18.060 DF =1 P=.000) as well as CD databases credibility p-value (χ^2=17.834 DF =1 P=.000). A smaller proportion of rural doctors (31.7%) considers the ease of use of online databases than do their counterparts, the urban doctors (67.0%), and a larger proportion of urban doctors (68.8%) believe in the influence of credibility on the use of CD databases than rural doctors (24.4%).

A difference is shown with regard to credibility and use of general medical websites p-value (χ^2=4.418 DF =1 P=.036), direct access to experts' websites p-value (χ^2=4.165 DF =1 P=.041), experts' websites ease of use p-value (χ^2=14.442 DF =1 P=.000), direct access to professional organization websites p-value (χ^2=6.493 DF =1 P=.011) as well as ease of use of professional organization websites p-value (χ^2=11.262 DF =1 P=.001).

Data suggest that rural doctors (51.2%) put more emphasis on credibility with regard to the use of general medical websites than do urban doctors (34.0%). More urban doctors (65.6%) consider instant access to experts' websites than do rural doctors (48.8%). A considerably larger proportion of urban doctors (61.4%) believes in the impact that the ease of use on utilizing experts' websites can have than rural doctors (29.3%). As for professional organization websites, direct access is believed to be influential by more urban doctors (62.8%) than rural

doctors (41.5%), also more urban doctors (68.8%) than rural doctors (41.5%) think that using professional organization websites can be influenced by ease of use.

5.3.3 Purposes for which information sources are used

For the purpose of this study doctors were offered a range of purposes and asked to report the purposes for which they used the different information sources.

5.3.3.1 Urban doctors' indications of purposes of information sources use

Looking at table (5.36) it appears that books are heavily used for patient based information as well as knowledge based information more than any other source. While journal articles are much more used to be up to date (66.97%) and for education purposes (48.37%). They are used less to answer questions posed by patients and their families (9.76%) and colleagues' questions (10.96%) as well. Proceedings are mainly to keep abreast of developments (65.58%) and for education (54.88%). Human resources are used considerably to confirm opinions (66.51%) and to provide health care to a patient (57.21%). 46.98% of urban doctors are using audio visual materials mostly to keep current with developments, and for education (42.79%).

Table (5.36) Urban doctors' purposes of use information sources

Purposes / Sources	To be up to date	To confirm opinion	For patient care	Education purpose	To write research paper	Answer patients'/ families' questions	Answer colleagues' question
Books	151	157	162	157	96	98	97
Journal articles	144	58	67	104	70	21	23
Proceedings	141	54	66	118	64	16	29
Prof. newsletters	125	42	62	88	52	21	26
Personal contacts	88	143	123	53	15	46	28
Audio-visual mat.	101	43	57	92	34	16	11
Online databases	108	46	49	77	46	18	20
CD-Rom	122	62	60	117	43	20	29
General med. sites	152	89	100	104	60	45	37
Specialists' sites	147	92	93	94	52	38	40
Prof. org. Sites	129	61	73	83	47	29	43

It is obvious from data that online databases are modestly consulted to confirm opinion (21.39%) or to care for patients (22.79%). While CD databases are used moderately to confirm opinion (28.84%) and to search for specific information to care for patients (27.91%). They are used more heavily for education (54.42%) and to be up to date (56.74%). Apart from books and personal contacts, internet based sources are used slightly more than other sources to confirm opinion or to provide health care. General medical websites is the most used source between the internet resources.

5.3.3.2 Rural doctors' indications of purposes of information sources use

Table (5.37) Rural doctors' purposes of use information sources

Purposes / Sources	To be up to date	To confirm opinion	For patient care	Education purpose	To write research paper	Answer patients'/ families' questions	Answer colleagues' questions
Books	28	33	32	28	12	14	19
Journal articles	32	15	16	24	11	4	7
Proceedings	31	10	15	20	9	2	4
Prof. newsletters	28	7	12	16	7	4	7
Personal contacts	23	27	21	10	2	9	7
Audio-visual mat.	23	8	16	16	3	4	4
Online databases	20	12	16	13	7	9	10
CD-Rom	19	12	15	18	4	2	7
General med. sites	32	20	22	24	10	6	10
Specialists' sites	23	16	16	14	6	5	7
Prof. org. Sites	23	9	10	17	7	2	6

It can be seen from table (5.37) that rural doctors tend to use books for the different purposes, more than the other sources. However to keep abreast of developments in the medical field they use journal articles, general medical websites and proceedings more than books and other resources. In addition general medical websites seems to be consulted more than online and CD

databases to confirm opinion and to provide patient care. Personal contacts are used more to confirm opinion compared with general medical websites. Apart from books, journal articles and general medical websites are used much more for education purposes than the other resources. In conclusion it appears from the data that rural doctors rely much more heavily on books and their colleagues to acquire patient based information than on the other resources.

As is shown in table (5.36) and table (5.37) it seems that rural doctors are not entirely different from urban doctors regarding the purposes for which they use the different information sources. Nonetheless statistical analysis shows that there is a statistical difference between them in the use of online databases for patient care with p-value (χ^2=4.790 DF =1 P=.029). Data suggest that a larger proportion (39.0%) of rural doctors than urban doctors (22.8%) use online databases to manage patient cases.

5.3.4 Doctors' level of satisfaction with retrieved information from different sources

To investigate whether the use of different resources is linked to the level of satisfaction with the retrieved information, doctors were asked to report how satisfied they were (very satisfied – very dissatisfied) with retrieved information.

5.3.4.1 Urban doctors' satisfaction of retrieved information from different resources

Table (5.38) Urban doctors' satisfaction with retrieved information from different resources

Satisfaction / Sources	V. satisfied	Satisfied	To some extent	Dissatisfied	V. dissatisfied
Books	129	73	10	2	1
Journal articles	28	78	85	23	1
Proceedings	16	64	103	27	5
Professional newsletters	17	64	99	32	3
Personal contacts	53	77	65	15	5
Audio-visual materials	25	88	85	12	4
Online databases	22	70	89	23	7
CD-Rom databases	46	92	68	5	2
General medical websites	77	81	41	13	2
experts' websites	94	74	40	4	2
Prof. org. websites	63	88	56	6	1

Before describing this table it should be made clear that some of the respondents did not answer all of the questions therefore the total was not 215 for all of the cells. According to data in Table (5.38) it appears that overall urban doctors are much more satisfied with the retrieved information from books and medical experts' websites in comparison to the other resources. In addition they are less satisfied with retrieved information from professional newsletters and proceedings, as a larger proportion 16.28% and 14.88% of them indicated that they are dissatisfied or very dissatisfied. Data also suggest that the level of satisfaction of urban doctors is higher with internet resources than online and CD

databases. Whereas 42.79% show that they are satisfied with information from online databases and 64.19% are satisfied with CD databases information. On the other hand, 73.49% were satisfied with general medical websites, (78.14%) satisfied with information from medical experts' websites and 70.23% were satisfied with retrieved information from professional organisation websites.

5.3.4.2 Rural doctors' satisfaction of retrieved information from different resources

Table (5.39) Rural doctors' satisfaction with retrieved information from different resources

Satisfaction / Sources	V. satisfied	Satisfied	To some extent	Dissatisfied	V. dissatisfied
Books	20	15	6	0	0
Journal articles	5	6	17	8	5
Proceedings	5	10	19	2	5
Professional newsletters	7	5	20	7	2
Personal contacts	4	21	15	0	1
Audio-visual materials	7	13	18	2	1
Online databases	4	12	16	7	2
CD-Rom databases	9	15	13	4	0
General medical websites	18	15	8	0	0
Specialists' websites	14	14	10	3	0
Prof. org. websites	9	14	13	4	1

Data in table (5.39) demonstrate that overall rural doctors are much more satisfied with the retrieved information from books and general medical websites in comparison to the other resources. In addition they are less satisfied with retrieved information from journal articles, as a larger proportion (31.71%) of them indicated that they are dissatisfied or very dissatisfied. The level of satisfaction of rural doctors appears to be higher with internet resources than online and CD databases. Whereas 39.02% show that they are satisfied with information from online databases and 58.54% were satisfied with CD databases information. On the other hand, 80.49% were satisfied with general medical websites, 68.29%

satisfied with information from specialists' websites and 56.09% were satisfied with retrieved information from professional organisation websites.

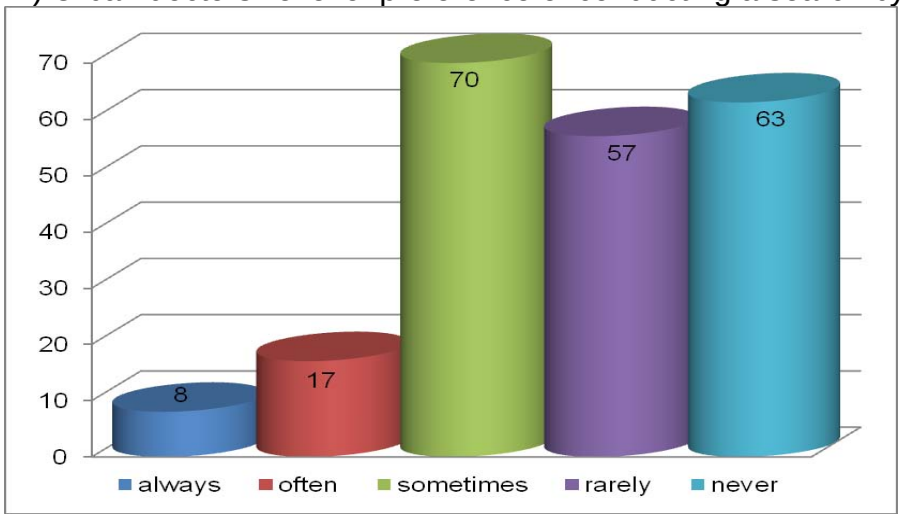
5.4 Doctors' information search skills

As a result of the information explosion, doctors encounter huge amounts of information resources. Electronic resources are employed to help manage the considerable amount of information. However, in order to carry out an accurate and detailed search to fulfil their information needs, they need to plan a successful search strategy and utilize a diversity of search techniques (such as Boolean parameters and truncation). For the purpose of this study doctors were asked to report their preference for delegating searches to a mediator and their use of specific electronic search techniques to evaluate whether their electronic search skills are sufficient and effective. In addition they were asked to indicate how easy it is to acquire information when they search by themselves.

5.4.1 Urban doctors' information search skills

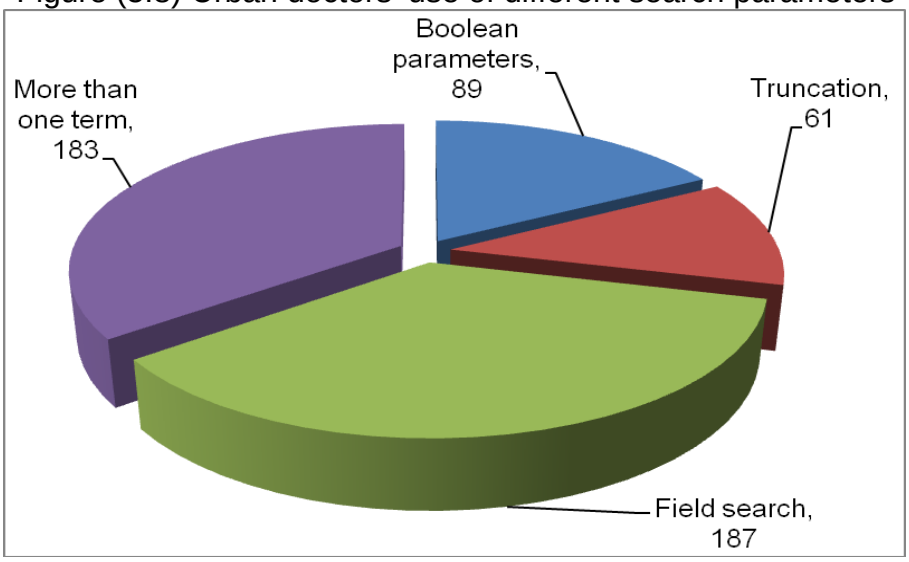
First of all doctors were asked to indicate whether they prefer to search for information by themselves or have it done by a mediator. As can be seen from Figure (5.7) the largest number reported that sometimes they would like to have the search performed by a mediator. However, only a few of them were willing to have the search conducted by a mediator (always or often 11.63%).

Figure (5.7) Urban doctors' level of preference of conducting a search by a mediator



As for their use of electronic search techniques, as is shown in figure (5.8), it appears that the larger proportion use the field search. In contrast few of them use truncation in search strategies. However although a large proportion of them use more than one term, few of them employ Boolean parameters.

Figure (5.8) Urban doctors' use of different search parameters



When they were asked to indicate whether it is easy for them to obtain what they want from some sources the majority (79.53%) reported that it is 'very easy' to 'easy' to find what they want in the general medical websites. In addition it was slightly easier to get answers to their questions from human resources (71.63%) than from libraries (69.77%). On the other hand, although a large proportion (43.26%) of urban doctors consider it easy to some extent to get what they need from online databases, more than quarter of them believe that online databases are the most difficult source to get information from compared to the other resources. Similarly with CD databases as a larger proportion of them (40.93%) believe it to some extent rather than easy or very easy. Table (5.40) displays urban doctors' reports about the ease of obtaining information from different sources and channels when they search by themselves.

Table (5.40) Urban doctors' indications of ease of obtaining information from different sources

Ease of search / Sources	V. easy	Easy	To some extent	Difficult	V. difficult
Libraries	71	79	51	13	1
Online databases	20	44	93	44	14
CD-databases	31	79	88	13	4
General med. websites	80	91	33	9	2
Specialists' websites	62	80	58	12	3
Prof. org. websites	59	73	74	7	2
Personal contacts	91	63	53	6	2

5.4.2 Rural doctors' information search skills

As is shown in Figure (5.9) approximately half of rural doctors sometimes have a preference to delegate a literature search to a mediator.

Figure (5.9) Rural doctors' level of preference of conducting a search by a mediator

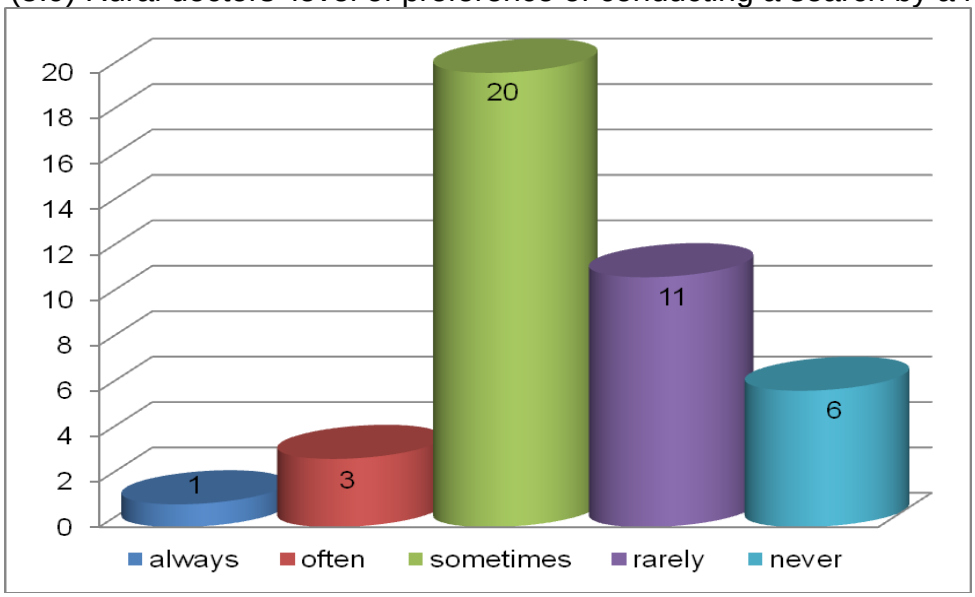
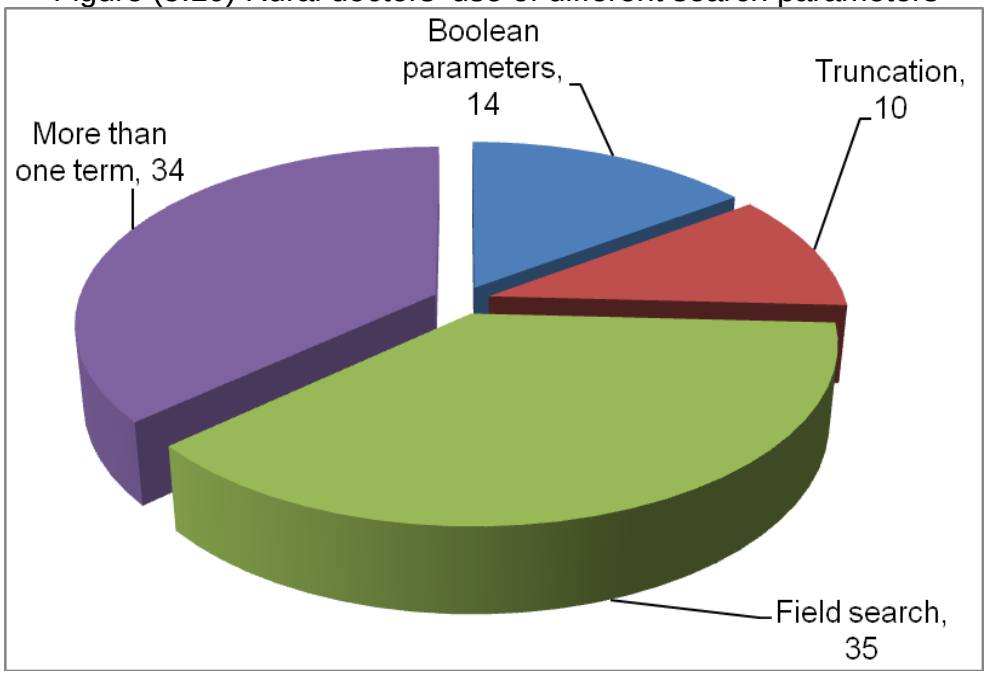


Figure (5.10) Rural doctors' use of different search parameters



As shown in Figure (5.10), when they were asked to report what kind of search techniques they are employing in searching electronic resources, similarly to urban doctors the majority demonstrated that they use field search and more than one term. Furthermore, they use Boolean parameters or truncation to a lesser extent in the search strategies.

Regarding their perception of the ease of obtaining information from different resources, it can be seen from table (5.41) that rural doctors consider acquiring information from general medical websites easier than other resources. On the other hand, it is more difficult with online databases compared to other resources. In addition the percent of doctors who think that it is 'very easy' to 'easy' to obtain information from libraries is larger (53.66%) than electronic databases and internet resources except general medical websites.

Table (5.41) Rural doctors' indications of ease of acquiring information from different sources

Ease of search / Sources	V. easy	Easy	To some extent	Difficult	V. difficult
Libraries	10	12	14	4	1
Online databases	3	6	19	8	5
CD-databases	5	13	20	2	1
General med. websites	10	16	15	0	0
Specialists' websites	8	9	20	3	1
Prof. org. websites	5	11	20	4	1
Personal contacts	9	15	15	1	1

5.4.3 Difference between urban and rural doctors

Although urban and rural doctors appear to be the same regarding their preference for delegating a search to a mediator and their use of different search parameters, the data suggest some differences in their perception of the ease of acquiring information from the different resources.

Table (5.42) P-value of urban and rural indications of ease of getting information from different sources

Sources	P-value
Libraries	0.116
Online databases	0.580
CD-databases	0.644
General med. websites	0.003
Specialists' websites	0.011
Prof. org. websites	0.011
Personal contacts	0.245

Table (5.42) demonstrates the difference between urban and rural doctors regarding the ease of obtaining information from different resources when conducting a search by themselves. It can be seen from the table that urban and rural doctors are the same with regard to the ease of acquiring information from

libraries, human resources and electronic databases. On the other hand, there is a statistical difference between them in reference to the ease of getting information from the internet resources. Data suggests that a larger proportion of urban doctors believe it is easy to find what they need from general medical websites (79.5%), expert websites (66%) and medical organization websites (61.4%) than rural doctors ((63.4%), (41.5%) and (39%)).

5.5 Problems encountered by doctors in the context of meeting their information needs

Although doctors in general have a level of satisfaction with information obtained from different resources and channels, data revealed some problems.

5.5.1 Urban doctors' reported problems

Table (5.43) Problems encountered by urban doctors when searching human and paper based resources

Source / Issue	Books	Journal	Proceedings	Newsletters	Human resources
Lack of access	105	157	171	160	50
Lack of time to search	73	73	72	62	18
Credibility issue	114	127	121	126	34
Poor paper search skills	30	52	60	51	0
Inconvenient place	109	123	142	115	12

As can be seen from table (5.43) urban doctors encountered different problems when searching human and paper based resources. Data suggested that a larger proportion of urban doctors reported that they are facing issues such as lack of access, credibility and inconvenient place more than lack of time to search or poor paper search skills. In addition, data revealed a lack of access to proceedings, newsletters and journals is considerably higher compared to books and human resources. Although more than half of the urban doctors encountered a credibility issue with books, these were slightly less in comparison to journals, newsletters and proceedings.

Table (5.44) Problems encountered by urban doctors when searching electronic based resources

Source / Issue	Online databases	CD databases	The internet
Lack of access	141	68	62
Lack of time to search	61	25	45
Credibility issue	146	27	35
Poor computer skills	73	65	74
Poor electronic search skills	109	98	111
Inconvenient place	104	54	91
Poor computer specifications	39	39	51
Slow electronic speed	71	49	117

As for electronic based resources, the data in table (5.44) suggest that fewer urban doctors face problems with CD databases than with online databases or the internet. In addition the table shows that lack of access, credibility, poor electronic search skills, inconvenient place and slow electronic speed are the most common problems with electronic based resources.

5.5.2 Rural doctors' reported problems

Table (5.45) Problems encountered by rural doctors when searching human and paper based resources

Source / Issue	Books	Journal	Proceedings	Newsletters	Human resources
Lack of access	18	32	32	29	9
Lack of time to search	12	12	15	11	8
Credibility issue	26	17	23	18	4
Poor paper search skills	11	15	13	11	0
Inconvenient place	18	25	25	22	4

It can be seen from table (5.45) that rural doctors encounter different problems when searching human and paper based resources. However the data reveals that lack of access to journals, proceedings and newsletters are more

common than the lack of access to books. In addition, a larger proportion of them believes that they encounter credibility issues with books and proceedings more than with the others. Inconvenient place is another issue that faced rural doctors, however it is slightly less common with books in comparison to other paper resources.

Table (5.46) Problems encountered by rural doctors when searching electronic based resources

Source / Issue	Online databases	CD databases	The internet
Lack of access	22	13	7
Lack of time to search	16	7	12
Credibility issue	11	7	5
Poor computer skills	13	11	18
Poor electronic search skills	21	19	26
Inconvenient place	17	9	15
Poor computer specifications	16	13	20
Slow electronic speed	16	14	31

Regarding electronic based resources, the data in Table (5.46) suggest that slightly fewer rural doctors face problems with CD databases in comparison to online databases or the internet. In addition, the table shows that lack of access, lack of time to search and credibility are more common problems with online databases than the internet. On the other hand, poor electronic search skills, poor computer specifications and slow electronic speed are more common with the internet than with online or CD databases.

5.5.3 Differences between urban and rural doctors' problems

The statistical analysis shows that there is a difference with some problems that face urban and rural doctors. First there is a statistical difference with reference to the credibility issue with journal articles p-value (χ^2= 4.337 DF =1 P=.037). Data suggest that a larger proportion (59.1%) of urban doctors than rural doctors (41.5%) believe that they have a credibility issue with journal articles.

Also there is a difference regarding the search skills with books p-value (χ^2=4.244 DF =1 P=.039). A large proportion of rural doctors (26.8%) think that they are facing problems when searching information in books compared to (14%) of urban doctors. Moreover, a significant difference is shown in reference to the poor computer specification for searching; the internet with p-value (χ^2=10.789 DF=1 P=.001); online databases p-value (χ^2=8.904 DF =1 P=.003) and the statistical difference to search CD databases with p-value (χ^2=3.916 DF =1 P=.048). The study outcomes suggest that more rural doctors encounter these problems than urban doctors. Finally there is evidence that urban doctors are not the same as rural doctors regarding the problem of electronic speed when searching the internet with p-value (χ^2=6.340 DF =1 P=.012). Results indicate that more rural doctors (75.6%) than urban doctors (54.4%) believe that surfing the internet is affected by the low electronic speed.

5.6 Summary

To sum up data in this chapter demonstrated that both urban and rural doctors use their own library or human sources in order to get information to fulfil their needs. Also it can be seen from the data that books; general medical websites and personal contacts with colleagues were the highly used as a source of information for both of urban and rural doctors. On the other hand there was underuse of electronic sources. Both urban and rural doctors tend to consider availability; instant access; credibility and ease of use the most important source characteristics that influence their usage of the different information sources. Data also indicated that both urban and rural doctors had inadequate information skills, particularly when searching electronic sources. Although both of them used fields and more than one term in their search strategy, Boolean parameters and truncation were underused and some of them were sometimes willing to delegate a search to a mediator.

Chapter six Qualitative results of information needs

6.1 Introduction

It is recognized that information systems have been established to help meet users' information needs. Therefore, it is important to recognize that identifying users' information needs is fundamental to develop information systems, in order to provide efficient and effective information services. This chapter presents the results of qualitative data regarding urban and rural doctors' information needs. Furthermore, this chapter intends to highlight some of the factors that might influence these needs, also the driving purpose behind doctors' information needs will be analyzed. The information seeking behaviour will be analysed later in this chapter.

For the purposes of qualitative analysis, initially general codes to describe different types of data were generated. Some of these codes were generated from the data exactly as it was mentioned by the interviewee without influence from the researcher. Some other codes were suggested by the researcher based on ideas from previous literature to indicate meanings and concepts identified from the interviews. However, the codes were modified as more transcripts were coded to make sure that the code precisely described the attached quotations. All of the quotations attached to each code were checked regularly to make sure that the new subgroups being generated were appropriate. Codes which had particularly large numbers of quotations were divided further into subcategories. While some codes with very few quotations were joined together whenever that was possible, others were left separate to indicate data that was less frequently mentioned by some of the interviewees.

The majority of the codes - the terms in the covering headings of these categories and the concepts - were derived from the main data as mentioned by the interviewees themselves; however some of the ideas and concepts were clustered under broader headings – codes - suggested by the researcher and stemming mainly from the research literature. These categories and concepts were presented in the figures in top down order, based on the frequencies they were referred to by the interviewees. Furthermore quotations from the interviewees were selected for each category to help indicate the type of information covered by each category. The number of quotations under each code

differs from one code to another. The selection of the quotations was based on whether they are needed to explain meaning as well as frequency. Three quotations indicate the type of information under the codes that were more frequently mentioned. For the less frequent codes only one or two quotations were selected to indicate their nature. The main reason behind presenting the less frequent codes is that they might be common information between doctors but not recognised, in other words doctors may need such information but it was not seen or remembered when interview was conducted.

6.2 Themes related to information needs

In order to organise and analyse these results they were divided into six main categories: patient based information; general health information; managerial information; context; reason or purpose and motivation as shown in figure (6.11). These categories were divided into sub categories as shown in figure (6.12).

Figure (6.11) Categories to analyse the qualitative information needs

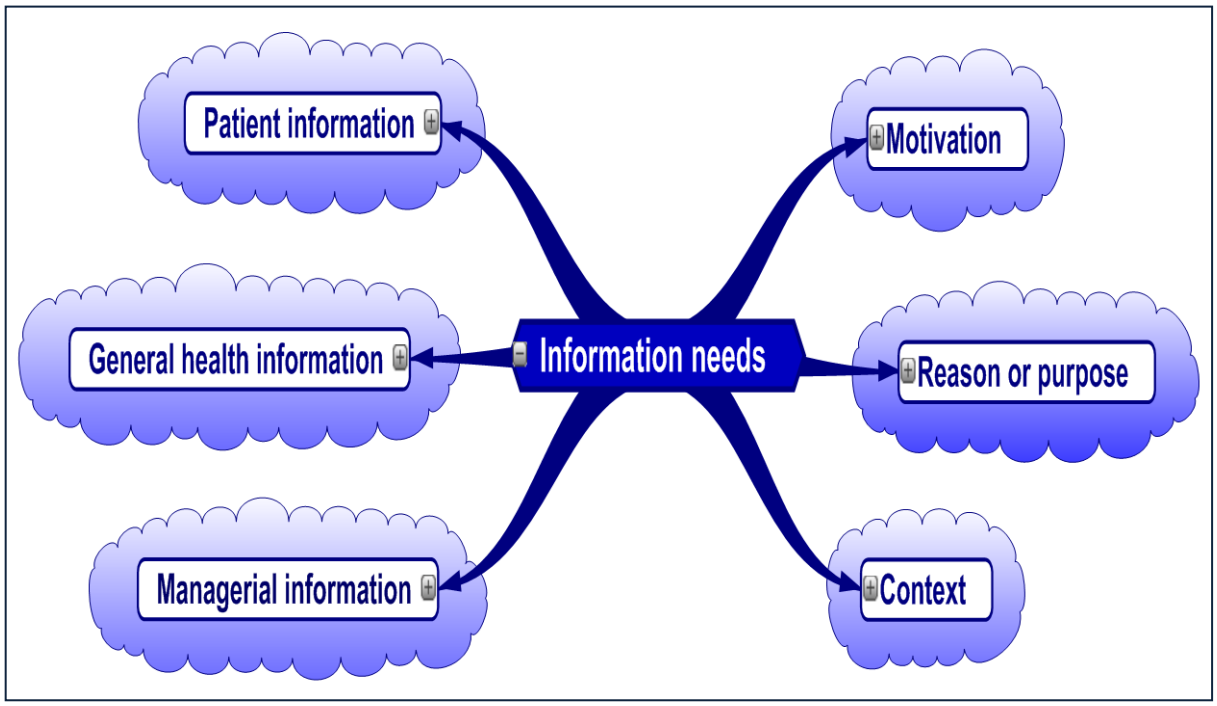
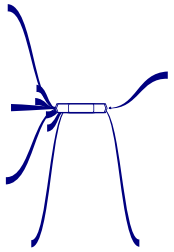


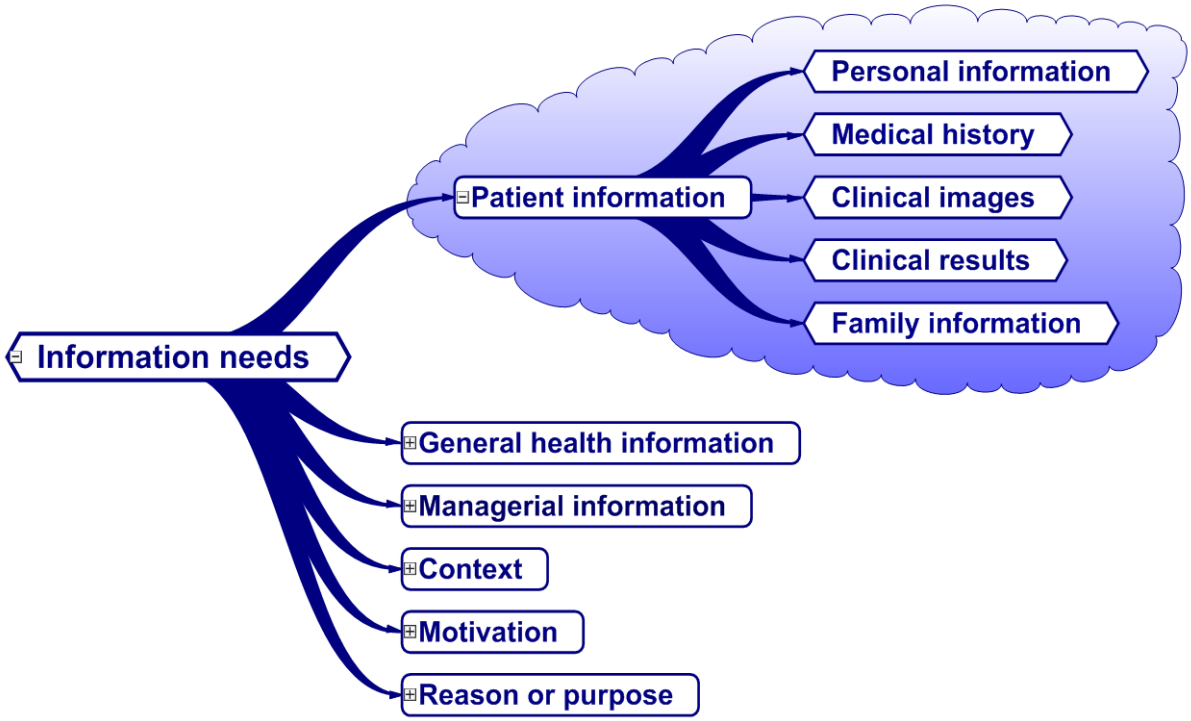
Figure (6.12) The different themes of information needs



6.2.1 Patient information

This category included all types of data concerned with a specific patient. Almost all the doctors indicated their needs for such information. The different information about patients that were identified clustered under five sub codes: personal information, medical history, clinical images of the patient, such as radiographs, MRI (magnetic resonance imaging), CT (computerised tomography) and ultrasound, clinical analysis results of the patient and the family information as shown in figure (6.13).

Figure (6.13) Subcategories of patient information



6.2.1.1 Personal information

Personal information includes full name, address details, telephone number and next kin. Personal information was shown to be an important key to access patients' records in order to manage the patient cases properly as indicated by the quotations:

> *"I think there should be central database for example I want to get access to the record of x whether in this hospital or any other hospital."* (Interview twenty-five)

> *"If patient was treated in the hospital in the past, of course I need to know what was done to the patient, and if the personal information such as name or date of discharge etc… of the patient is kept in digital form it will help me to get access to all information about the patient."* (Interview thirty-one)

Furthermore, doctors believe that there is a need for such information to be in detail in order to avoid confusion and to be able to identify which record is which patient:

> *"The problem when the information is not detailed for example some people give the first two names and the family name, some give the first three names others the first name and the family name, and because the potential for similar names exists you may get different records with the same name, so which is which, therefore detailed personal information name address etc… should be there to help me."* (Interview twenty-five)

6.2.1.2 Medical history

Medical history refers to information about the past or recent experience of any type of diseases, any previous medical intervention and the results of previous clinical results. Furthermore, any information acquired about the patient from the doctors' observations of any signs and symptoms from physical assessment is coded under this theme. Data revealed that the medical history of the patient is one of the important information needs that are believed to help doctors take an appropriate medical decision:

> *"The patient history for example when the signs started with the patient, whether the family has the disease history or has the patient ever been admitted and treated in the hospital, indeed it is very important for me."* (Interview ten)

> *"We cannot start chemotherapy for the patient without getting the medical history of the patient, because there may be different diagnosis and they may have started a medical regime, so we should not start another medical regime as it may threaten the life."* (Interview thirteen)
>
> *"The medical history of the patient is very important for me, some patients for example need to be followed up and the documentation of the medical history is the responsibility of the patients because some of them receive medical treatment or they may have had a surgical operation outside of the country and such information is very important for the purpose of diagnosis, investigation and treatment."* (Interview twenty-four)

In addition, doctors experienced situations where they find themselves confused due to the lack of information about the medical history of the patient:

> *"The question that made me confused is whether the patient was complaining from any disease in the past, chronic disease or was he complaining of congenital heart disease."* (Interview twenty-one)

Doctors indicated that they get such information from the patient file when he or she already had been in wards in the hospital, with condition that patient should bring the discharge document or the patient can remember the exact discharge date from the hospital. But if the patient has not been admitted to the hospital, or more than five years ago was in the hospital or had already been admitted but in another hospital, doctors' access depends mainly on the patient and whether he/s or his/her relatives could provide such information as the following quotations indicate:

> *"It's important for me to get this information from the patient or his relative in case the patient do not know about his/her disease as in our department of oncology the patient may not have idea about his disease or if he can bring the discharge paper I would get this information from his file in the hospital."* (Interview thirteen)

“My work starts with history investigation then diagnosis the history from the patient or his relative and the file of the patient in the hospital.”(Interview sixteen)

“if the patient brings the discharge paper with him or he can remember when he was discharged from the hospital I can get his history from his file otherwise we depend on the patient or his relative to get such information even if he has never been in the hospital or he was here a long time ago; as unfortunately the file is preserved in the archives for only five years, also if he had been in another hospital we cannot access such information.” (Interview twenty-five)

“I can get access to this information if the patient brings the discharge paper with him.” (Interview twenty-six)

6.2.1.3 Clinical images of the patient

This theme incorporated all kinds of clinical images that can show the existence of any abnormality in the patient’s health, examples of clinical images of the patient include radiographs, MRI (magnetic resonance imaging scan), CT (computerised tomography) and ultrasound.

Clinical images of the patient are seen to be important information for doctors at the time of investigation to reach the most appropriate diagnosis, to decide about the treatment plan and the drugs needed to cure the patient, as well as for the purpose of patient follow up:

“In the morning round we ask for different types of clinical images such as CT scan or ultra sound image for the patient to make a decision regarding the treatment… if there is no new patients we check the already existed patient’s clinical images to decide discharge or any change in the treatment plan.” (Interview one)

“In the case of blood clot we need to make an appointment for CT scan and wait for the result.” (Interview twenty-eight)

"If the tumour is not clear with the ultra sound we have to ask for MRI or CT scan to get enough information about the case." (Interview thirty-three)

6.2.1.4 Clinical results of the patient

Doctors believe that clinical analysis results of the patient are key factors in order to make a right diagnosis:

"I suspect that the patient has bleeding so I needed to know the haemoglobin and the pulse rate." (Interview nine)

"I wish all the clinical analysis of the patient is collected in one paper file or electronic database, which would save time and effort, and enable the right diagnosis." (Interview twenty three)

"The patient may have a lymphatic tumour and may be at an advanced stage, however I cannot decide until I get the clinical analysis results." (Interview twenty-five)

"In the daily round we check the patients in the ward, check their clinical analysis to manage their health problems." (Interview twenty-seven)

6.2.1.5 Family information

Family information covers all kind of health information about the family of the patient, for example chronic diseases, experience of particular diseases, such as blood clot and congenital defects or abnormalities. Family information helps doctors in the course of diagnosis and treatment:

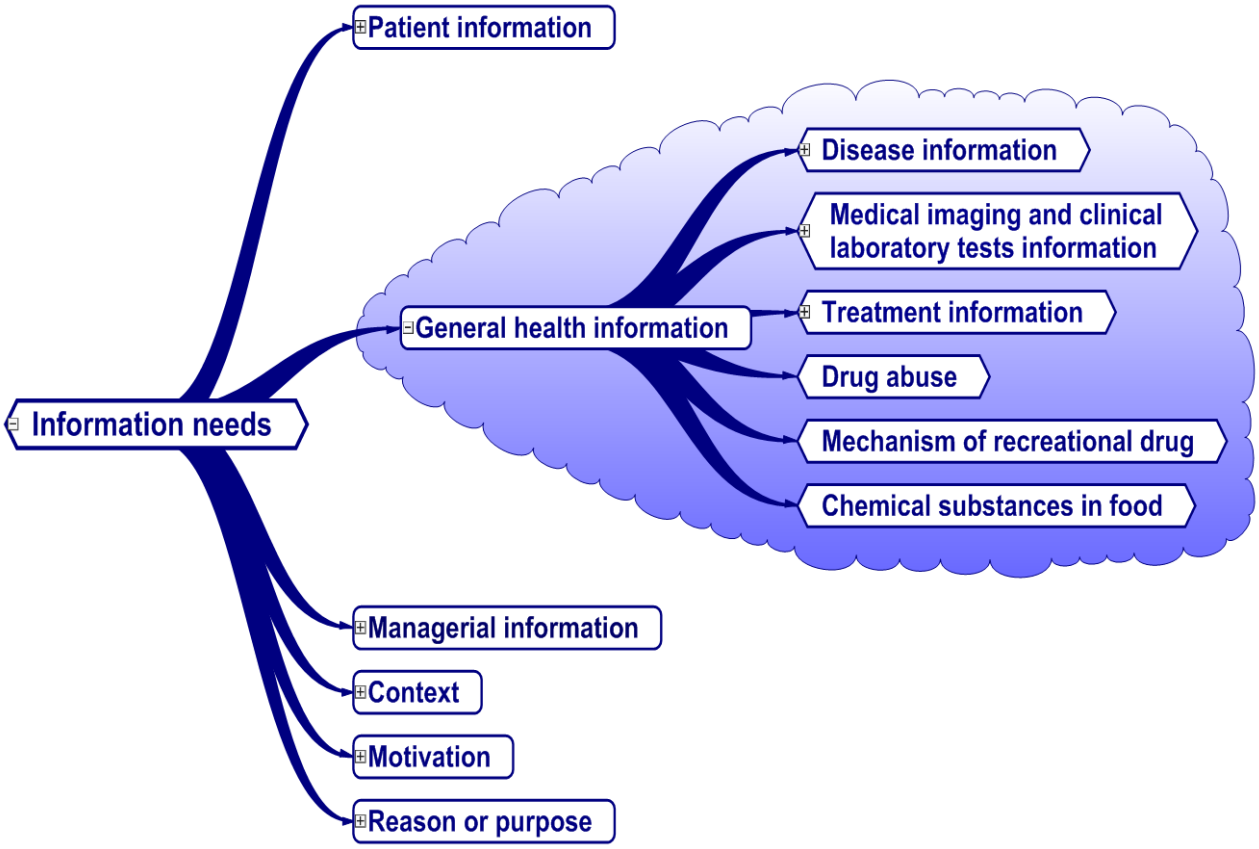
"Also the family history is important; to know if any family member has a chronic disease or problem with anaesthesia such information must be taken into consideration." (Interview five)

"It is important for me to know whether anyone in the family has a history of the disease." (Interview ten)

6.2.2. General health information

All medical nature information that is not related to a particular patient for instance if doctor needs information about different medical images, reasons for causes disease, drug dose and so on so forth. Such information differs from specific patient information; therefore it was classified under this category. This type of information was coded under six major categories: the first is disease information, which is subdivided further into three subcategories: aetiology, physical signs and symptoms and disease conditions. The second category is medical imaging and clinical laboratory tests information and all types of medical images. The third category is treatment information, which includes the subcategory drug information, management process, evidence based medicine and the medical complications. The fourth category is drug abuse. The fifth is the mechanism of the recreational drug and the sixth category is chemical substance in food as shown in figure (6.14). Doctors showed that they need general health based information to develop their background in the medical field.

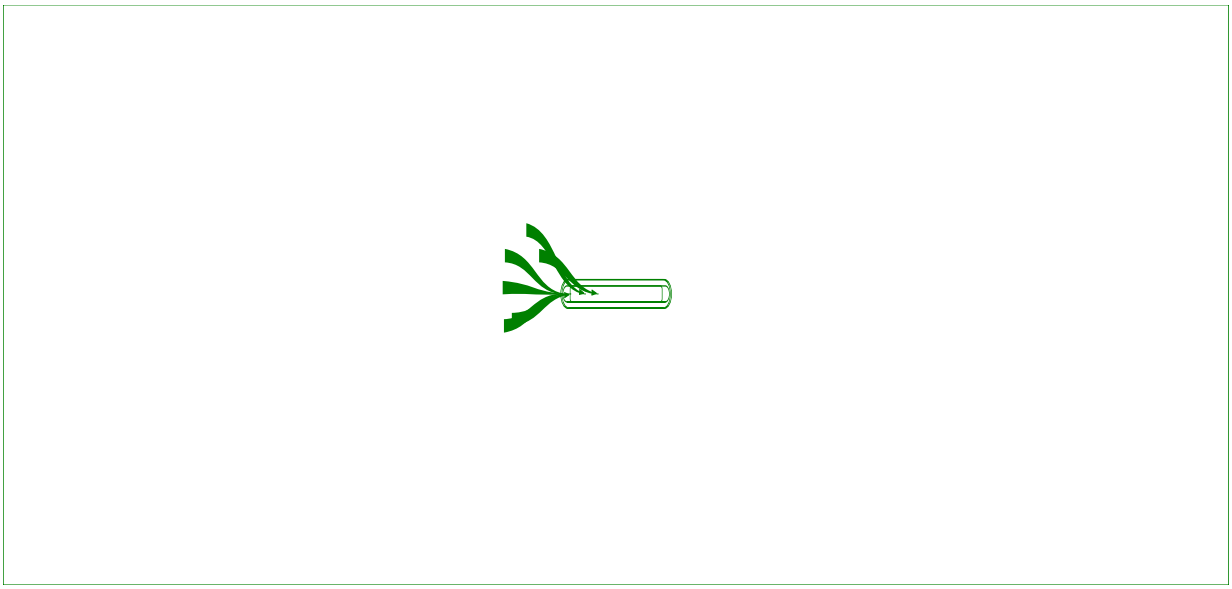
Figure (6.14) The main themes under general health nature information



6.2.2.1 Disease information

As different types of information were coded under this theme, it was divided further into sub categories: physical signs and symptoms, which were divided into three sub categories, aetiology and disease condition. Figure (6.15) shows the different information needs that were identified regarding disease information.

Figure (6.15) Sub categories of disease information



6.2.2.1.1 Physical signs and symptoms

This theme covers the symptoms or complaints that would be expressed by the patients and any physical signs that can be observed by physical examinations. For the purpose of clear analysis and better presentation the information that was identified under this theme was broken down further into three sub categories; the first is to identify information about causes of particular signs and symptoms; the second category is to identify information about the likely signs and symptoms of a particular disease and the third category is information about typical and untypical symptoms of a disease. The difference between the first two types is the type of information needed, for example if a doctor faces symptoms or signs and he want to know the disease that might cause such symptoms then he needs information about the disease in order for example, to know how it can be investigated and cured in first place. On the other hand, if he knows a particular disease and wants to find out the outputs of that disease in

such a scenario the doctor is looking for information about the symptoms not the disease itself.

6.2.2.1.1.1 What are the reasons behind particular signs and symptoms?

In these situations doctors are faced with signs and symptoms and need information to know the likely reason to cause the signs and symptoms.

> *"There was a case that had a kidney transplant and started hypoglycaemia, hyponatremia, the pulse rate was low and went in a coma as well, though she was in the process of dialysis, I did not know what was the reason."* (Interview twenty-six)
>
> *"There is a case in the hospital and although she is on regular kidney dialysis, the blood pressure is really high, and that is abnormal in her case as she is on regular dialysis and taking the treatment regularly as well, so what causes high blood pressure."* (Interview twenty-seven)
>
> *"There was a case with abdominal pain and vaginal discharge the normal investigation was normal, so what is the reason for these symptoms and signs, I have ordered a urine culture, the result showed a particular type of bacteria that is not common in here, however we treated the case with the appropriate treatment and that is because we identified the reason of that symptoms and signs."* (Interview thirty-four)

6.2.2.1.1.2 What symptoms or signs can be caused by a particular disease?

In this case doctors are not confronted with particular signs and symptoms but they think that they need to know the signs and symptoms that can be caused by a particular disease; furthermore they need to know whether a particular disease could cause specific signs and symptoms in order to confirm their medical decision:

“In our field there are two types of symptoms typical and untypical, usually what doctors know is the typical ones, therefore doctors need to get information about the untypical symptoms that are likely to happen because of the disease.” (Interview fifteen)

“The book gives me information that I need, for example if the patient suffers a lack of potassium in this case the book would give me all the reasons that cause the lack of potassium in addition to the symptoms and signs that may appear on the patient because of that.” (Interview twenty-five)

“Because the case is vague I asked the consultant after that I read more about the disease as the disease might have other symptoms and I have to know the other symptoms and signs to be prepared for such case in the future.” (Interview twenty-six)

6.2.2.1.1.3 Typical and untypical symptoms

Doctors believe that they need to know about the typical and untypical symptoms of diseases in order to manage the cases properly.

“As there are typical and untypical symptoms of diseases, you need to get information about the symptoms of the disease particularly when there are untypical symptoms, to know whether you are in the right way or not.” (Interview fifteen)

“all that we can do is to memorise the common (the typical) symptoms but untypical ones we need to read about them in this book in the case of blood pressure as it shows this symptoms 5%, this 10%, this 20% and this 25% the last one we know but the others we need information about them.” (Interview twenty-five)

6.2.2.1.2 Aetiology

Aetiology indicates the different reasons that might cause a disease. Doctors experienced circumstances where they found that they need to know the causes of a particular disease in particular conditions in order to make a medical decision about the appropriate treatment for the case:

> *"There is a case in the hospital now he is a twenty-seven years old male, he has had schizophrenia for a long time ago. Also he was treated for Leukaemia, ten days ago he came to the hospital with symptoms of paralysis in his hand, leg and the facial muscles in addition he was vomiting and felt a severe headache as well, we thought it may be related to the Leukaemia but a CT - Scan (Computed tomography) showed he is suffering from a stroke, but we did not expect that, particularly in his situation, his age and his blood appeared to be normal, so I wanted to know about the cause of a stroke in young people or whether the drugs he takes for the schizophrenia have a link I really want to know the reason to know what must be done."* (Interview one)
>
> *"I faced a case suffering from urticaria which may be caused by infection, food allergy and so on and so forth, the patient has not responded to the treatment, when I searched the pathogens of the disease I found almost fifty factors may cause this disease, so if you cannot specify a particular reason it is difficult to manage the case."* (Interview two)
>
> *"There was a child who had breadth of ureters and kidney failure the different investigations did not show a particular reason for that so that it can be treated, some doctors suggested to implant ureters but I knew that such an operation is dangerous in this situation, however although we dealt with the case, the management was not optimal and we still need to know the cause of the breadth in order to manage the case appropriately."* (Interview twenty-three)

Also aetiology is believed to be important information that helps doctors for the purposes of study and research:

> *"In ninety-five I was doing study to know the main cause of the fungus that caused tinea capitis in this city."* (Interview eleven)

6.2.2.1.3 Disease conditions

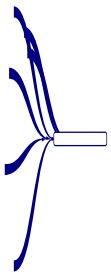
This category covered information such as whether the disease has a particular form in a particular situation or, in other words, if the disease develops in cases where the patient is suffering from other diseases. Doctors thought that knowing disease conditions that prompt or contribute to a disease may help them to make a decision about the type of treatment:

> *"I faced a case who was suffering anaemia and was on treatment for thyroid deficiencies, I prescribed normal treatment for the anaemia but there was no response, when I read about the anaemia with thyroid deficiencies I found that iron affected the absorption of the thyroid hormone."* (Interview eight)
>
> *"There are some diseases that have routine treatment, however if you know that the patient has another health problem, in such a case the routine treatment is not recommended or precluded, I may not be able to remember what should be done, so I need such information to help me to know the other options."* (Interview ten)
>
> *"Because the condition of the disease may differ from one patient to another though the disease is the same, you need to benefit from the experience of others to get information about the different condition of the disease."* (Interview twenty-three)

6.2.2.2 Medical imaging and clinical laboratory tests

This category is concerned with the medical investigations that result in images or text data (letters and numbers) that would show any abnormalities or defects in the health of the patient. Doctors believe that they need such information to manage and diagnose the patient health problems. As the main heading of the theme suggests, information that was identified under this theme was coded under two sub headings one for the medical images and the other for the clinical laboratory tests as visualised in figure (6.16).

Figure (6.16) Sub categories of investigation information



6.2.2.2.1 Clinical laboratory tests information

Doctors believe that they need information about the laboratory tests that can help them at the time of diagnosis. Doctors need such information due to the fact

that although there are general common laboratory tests which can usually be identified by doctors, there are another specific laboratory tests for a particular disease which are not remembered all the time. There are large numbers of laboratory tests which may make it difficult to remember the most appropriate test for a case:

> *"I sometimes face a situation where I find myself forgeting a particular test for the disease."* (Interview ten)
>
> *"The nature of work in maternity wards requires two types of clinical laboratory tests. The first is routine investigations which is general for all the patients in the ward and the second special investigations this type depends on the patient case, the second one is what I sometimes need information about."* (Interview thirty-two)

Laboratory tests are considered very important in order to make a decision for the purpose of diagnosis and treatment planning. However, doctors encounter cases that made them confused and unable to decide which investigations they should have requested:

> *"Sometimes I face a very vague case that makes me unable to decide which investigation I should ask for."* (Interview nine)
>
> *"If the case is urinary tract infections straight away it is culture but in case of rare disease or new disease I need to consult information sources to decide about the necessary investigations to reach the right diagnosis."* (Interview thirty-four)

Also the doctors believe that there might be a new investigation tests and they think that they need to know about such new investigations in order to help them identify or confirm disease:

> *"Due to the development in the medical field there may be a new investigation for a disease, which really happen, and I need to get detailed information about such investigations to be up to date and to manage the patient case properly."* (Interview fifteen)

Doctors consider laboratory tests information important not only to be able to order the appropriate test for the patient, but also to be able to read and understand the results of the investigation to make the medical decision:

> *"For me as a Pathologist sometimes I get some strange findings and in such cases I need information about them to be able to explain and make the report."* (Interview twelve)
>
> *"I wish if the pathologist and the clinical laboratory technician give me clear report some thing clear cut to make my decision because sometimes I cannot understand the report I need such information that help me understand the report."* (Interview eighteen)

6.2.2.2.2 Radiations or clinical imaging information

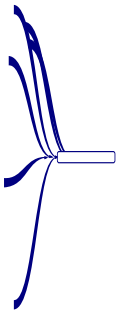
Although this information was mentioned by only one doctor, it needs to be considered as the doctor who mentioned this information is a consultant who has long experience in his field. In addition, he is a member of teaching staff at the university also it is likely to be common but was not recognised by other doctors:

> *"As a surgeon sometimes I am unable to make a decision due to a vague result of the CT scan or the ultrasound report, I wish I could get clear cut information from the radiologist as my decision depends on them."* (Interview eighteen)

6.2.2.3 Treatment information

Treatment information is one of the types of information that has been identified as needed information. Information that was coded under this theme included: drug information, the management process of patients, evidence based medicine and medical complications as illustrated in figure (6.17).

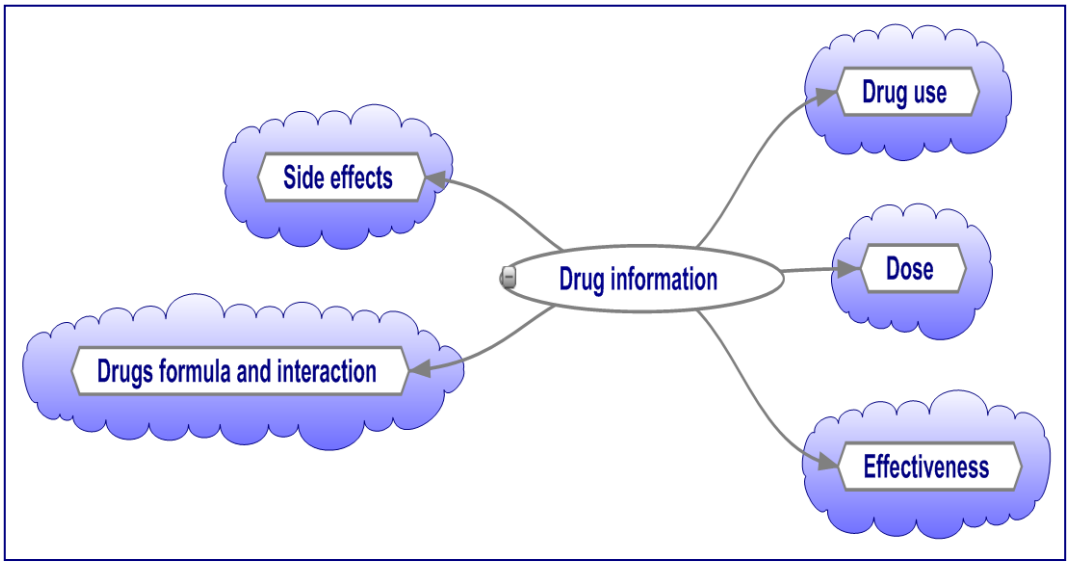
Figure (6.17) Sub categories of treatment information



6.2.2.3.1 Drug information

This category covers information related to medical intervention that uses any type of medical chemical substance to cure a patient. Doctors articulated that they experienced situations where they needed detailed information about a particular medicine or drug in order to cure patients. A breakdown of the drug information that was identified included: drug use, dose, effectiveness, side effect and drug formula and interaction as shown in figure (6.18).

Figure (6.18) Sub themes of drug information



6.2.2.3.1.1 Drug use

"There is drug called propofol in 2008 it was not used with children less than three years old, but in late in 2009 there was study which proved that it is safe to use the drug, which is very important for me as it affects my daily practice." (Interview five)

"I have got this book it is about a drug for diabetes called (Glucopen) I can get information about its usage." (Interview twenty-five)

"Always when there is a new drug in our department I need to get some information about its use, where it was used how many and so on and so forth our use cannot be randomly." (Interview thirty-one)

6.2.2.3.1.2 Dose:

Dosage information is another type of information needed in the course of patient treatment. Due to the large number of different medicines it is difficult for doctors to memorise all medicine doses:

"Doctor does not need to memorise, if there are facilities that help to login and search the dose." (Interview eight)

“As an anaesthetist I always need to know and check the dose before I go to the theatre.” (Interview thirty)

“I know that the drug dose in her case should be given according to the international standards which order to be given in milligram and based on the weight, so I needed this information to start the treatment.” (Interview thirty-four)

6.2.2.3.1.3 Effectiveness.

Doctors believe that the effectiveness of the therapy is important information and influences their medical decision:

“I want to know the effectiveness of using Ultraviolet phototherapy as a treatment of vitiligo.” (Interview eleven)

“There may be a new drug or new medical regime that has a good effectiveness with another group, so they would have been better to be added to a particular group of medicine to get the best effect.” (Interview thirteen)

“When there is new drug I need to know ‘how efficient is it?’ For example whether it eliminates the disease or works as pain relief after surgery.” (Interview thirty-one)

6.2.2.3.1.4 Side effects:

Doctors experienced situations where the patient was taking a particular medicine and wanted to find out whether it has any effect that caused the health problem:

“I wanted to know whether the psychotropic drugs that were taken by the patient have any link to the health problem.” (Interview one)

“There might be some side effects and I have to know whether it is linked to the medicine or caused by other diseases.” (Interview eight)

“If you know the patient history, it is important to get information about the medicine to know what is likely to happen to the patient.” (Interview fifteen)

“Of course there is a particular protocol for each case, but if the patient is suffering with for example, heart disease or liver failure, this will constrain my choice of drug, hence I really need such information.” (Interview thirty)

6.2.2.3.1.5 Formula and interaction:

The formula of the drug and interaction with other drugs is important information that helps doctors choose the suitable medicine for the patient:

“The representative gives you the information about the medicine and its interaction so that you can make a decision to use the most appropriate medicine for the patient.” (Interview twenty-two)

“As well I can get information in this book about the absorption of the drug and its movement into the bloodstream.” (Interview twenty-five)

“Doctors explained the interaction of the drug. In the case of postnatal bleeding it is essential to know the formula of the drug that you are going to use.” (Interview thirty-two)

6.2.2.3.2 Management process of the patient

In this category the quotations indicate that doctors sometimes do not know how or where to start with the patient, so they need to know and obtain information that can help them to manage (investigate, diagnose and decide about medical intervention or not) the health problem of the patient:

“I was not able to start the process because I did not know what to do; what investigation I should have requested and what medicine I should have used. All I did was I considered the case as a chemical burn and transferred him to the causality hospital.” (Interview seven)

"I prefer to benefit from the experience of the consultant in cases where I needed information that helps to diagnose the disease and the way of the treatment and management, in addition to reading the disease books that help to support that information." (Interview twenty-three)

"I always ask the consultant what I should do for the case." (Interview twenty-six)

6.2.2.3.3 Evidence based medicine

Doctors declared that they sometimes face cases where they found themselves needing information in order to balance between the medical intervention and its complications. The quotations in this category indicate this type of information need:

"*The real issue was to get information to answer the question, 'was it necessary to be treated for tuberculosis despite the fact that the tuberculosis treatment drugs will exacerbate the problem of hepatitis'."* (Interview twenty-five)

"Before I started the drug therapy I read about and consulted professors to know whether the patient would benefit or not as that drug has a serious complication." (Interview thirty-three)

"*I needed information to know what was the best for the patient, if it was better to wait, was it better to start drug therapy or better to make a surgical intervention."* (Interview thirty-four)

6.2.2.3.4 Medical complications

Medical complications refer to the situations where a disease by itself or any medical intervention could lead to harm to another body organ system. Doctors experienced a situation where they found themselves needing such information:

"*There was a patient who underwent an operation to remove his appendix and he was taking recreational drugs. After the*

operation he went into a coma and his kidney functions was high. At that time I was in need of information to know why these complications happen, whether it is due to the recreational drug or the surgical intervention." (Interview six)

"The medical intervention may cause complications to the patient. I need to know these complications because I do not want anyone to take legal action against me in the future." (Interview seven)

"I wanted some information to get to know the complications that have been brought forth to her leg because of the disease. I was still dealing with the underlying cause but there is no response. This is the type of information that I really need." (Interview twelve)

"I need to check the drugs that I want to give to the patient as there may be contraindications and I do not want any complications to be brought forth by me." (Interview thirty)

The above type of general health nature information is the most common information needs that were identified from the analysis of the interviews with the doctors. However there are other types of information needs that were less common than the one above. These are presented in order to give the most comprehensive picture possible of the doctors' information needs. Furthermore, they may be common but the doctors were not fully aware of theme. The less common treatment information needs that were identified included:

6.2.2.4 Drug abuse

"I want to know what type of drug abuse is out there to know how they affected his kidney functions that lead to increase of urea and creatinine." (Interview six)

6.2.2.5 Mechanism of the recreational drug

"I wanted to know what these hormones that athletes consume are and how they work in the human body; I wanted to know their effect on the biology of the organism and what they expel from the body." (Interview six)

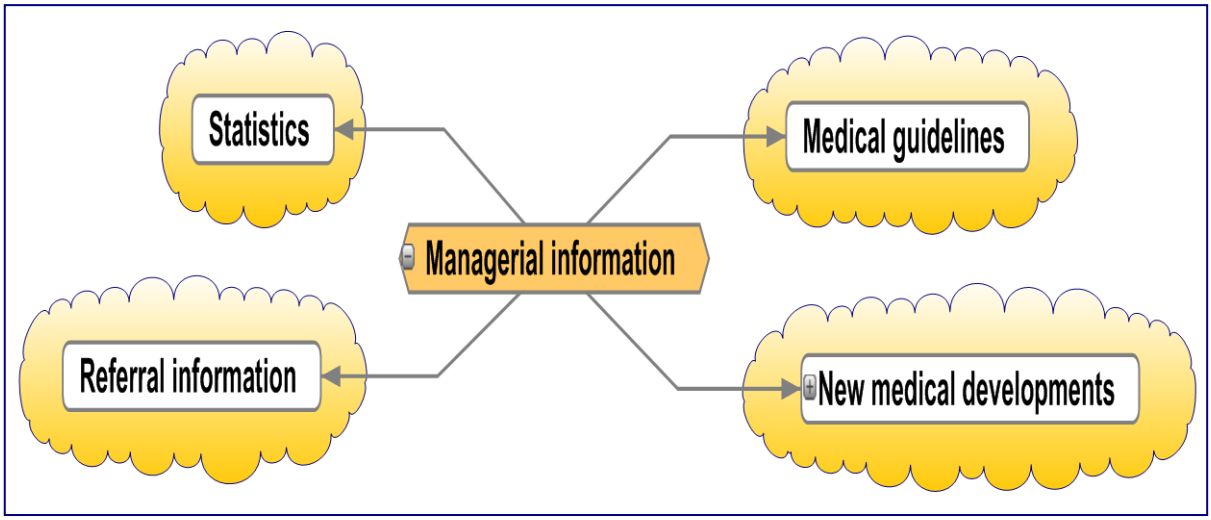
6.2.2.6 Chemical substance in food

"Some people are allergic to some kinds of chemical substances that are in some types of foods, for example I have got a patient who is allergic to nickel so he must avoid all the food that contains nickel, as a dermatologist it is difficult for me to memorise all the food and its components so I need something to help me do so." (Interview seven)

6.2.3 Managerial information

This theme covers all kinds of information that helps doctors to perform their tasks to know how to do the work. The following managerial information was identified: medical guidelines, new medical developments, referral information and statistics as shown in figure (6.19). The statistics were suggested to be clustered under this theme as they were indicated to be needed at the time of medical decision to cure a patient.

Figure (6.19) Sub categories of managerial information



6.2.3.1 Medical guidelines:

This theme refers to official documents that can support and direct the medical decisions by identifying the criteria that help with investigation, diagnosis and treatment. Data indicate a great need for such information:

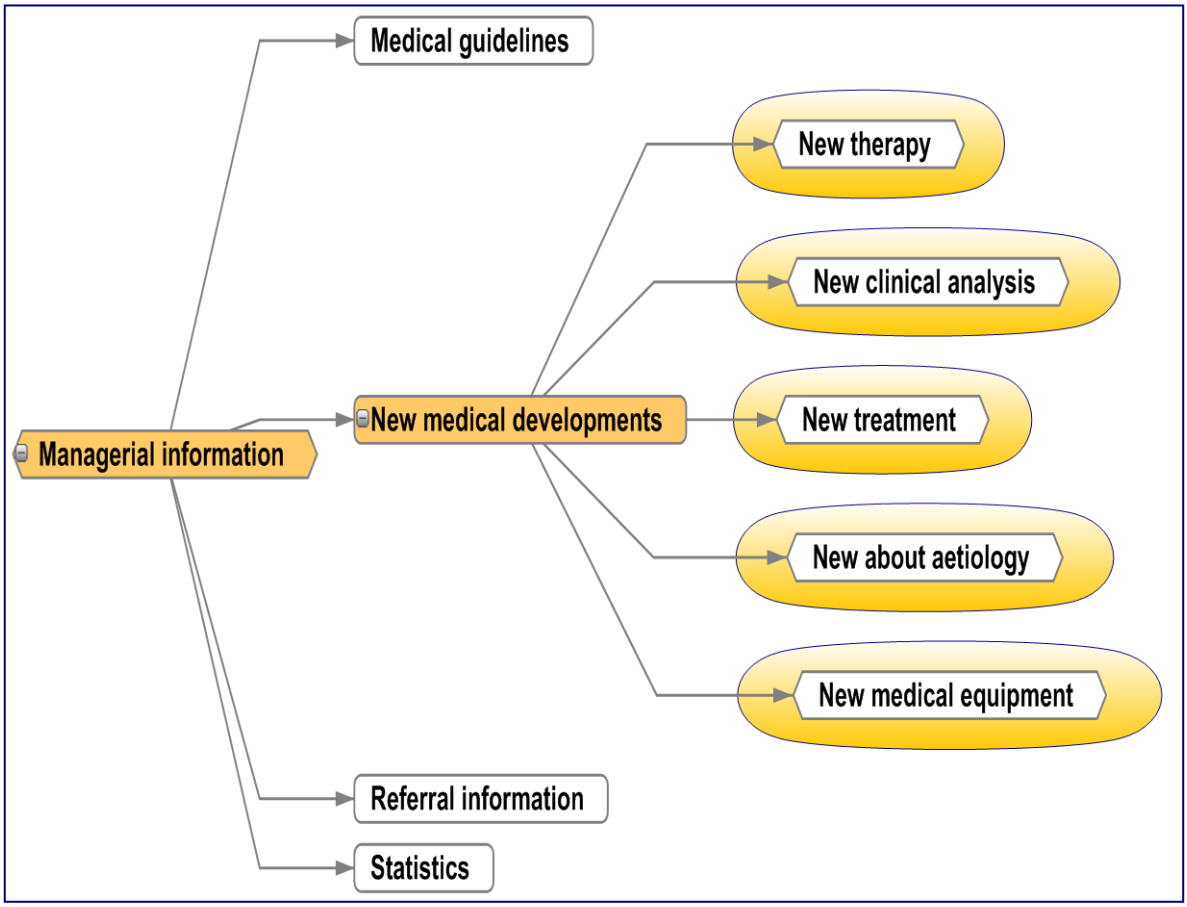
> *"Unfortunately we did not have guidelines; I know there are the British, Scottish, American, South American and many others. However you cannot use either American or European guidelines, we should have our guidelines."* (Interview eighteen)
>
> *"The difficult problem that we encounter in the daily clinical work is that there are no strict guidelines."* (Interview twenty-three)

"The problem that makes our work difficult is the lack of guidelines that make the work running smoothly and easily. In addition it will help with identifying mistakes." (Interview thirty-four)

6.2.3.2 New medical developments:

Doctors expressed a need for information about new medical developments. For the purpose of organisation, this category was divided into sub categories as shown in figure (6.20).

Figure (6.20) Sub categories of new medical developments



6.2.3.2.1 New information about therapy

> *"Information sources help me to get information about the new medicine that may help the patient and eradicate the disease."* (Interview thirty-one)

6.2.3.2.2 New information about new clinical analysis

> *"When there is new clinical analysis we get information about them from the representative of the company."* (Interview fifteen)

6.2.3.2.3 New information about treatment and management

> *"Information sources do help me acquire the latest information about the management in a particular area."* (Interview twenty-three)

6.2.3.2.4 New information about aetiology:

> *"The medical journals help me to know the new developments for example you may get new information about a new reason for the lack of potassium, sodium or sugar… etc and I need such information that may help me to manage a patient."* (Interview twenty-five)

6.2.3.2.5 New information about medical equipments

> *"I have paid to attend a training programme about a new device (laser) for radiotherapy, though we do not have it in the hospital at the moment, but I got new information about it."* (Interview two)

6.2.3.3 Referral information:

Although only one doctor clearly indicated a need for such information, some doctors implicitly indicate a need for referral information:

“I want to refer to one of the consultant but which one should I refer to.” (Interview one)

“For example if the patient has a gland problem I know Doctor Suwalem he specialized in gland disorders. I can call him and ask if I can transfer the patient to him.” (Interview twenty-five)

6.2.3.4 Statistics:

This type of information was identified by few of the doctors particularly consultants as important information for the purpose of clinical decision making:

“Few days ago I was looking for some statistics, I did not know where to find them it was difficult.” (Interview twenty-four)

“Statistics about the countries and the number of those who used particularly the new drugs, getting such information helps me to make a decision about using the drug or not.” (Interview thirty-one)

6.3 Context

Although the context may be defined according to different factors, in this category the term context refers to the nature of the work that doctors are engaged in and the defined task that needs to be done and in which information needs happen. Before analysing the context where the problem of lack of information comes out and an action to get information becomes conscious, the following themes about work nature were identified:

6.3.1 Clinical work

All of the doctors interviewed indicated that they are engaged in the clinical work on a daily base:

> *"The daily work starts with the morning round where we see the previous patients and the results of the different investigations that are required for them, in addition to the managing the new patient cases."* (Interview one)
>
> *"For me as a consultant although the work differs from day to day, it usually starts with a morning round to check patients' cases, their progress, their investigation results, to recommend change, increase or decrease of the treatment course."* (Interview eleven)
>
> *"The weekdays are divided into surgical days, recall days and the morning round."* (Interview thirty-two)

6.3.2 Educational work

Some doctors participated in an education programme as a student to obtain a particular degree:

> *"For me, as a postgraduate student, I have finished the first part for the master degree and there is another part to finish up."* (Interview nine)
>
> *"I am registered in the Libyan board for medical specialists and master degree programme."* (Interview twenty-one)

Some other doctors were engaged in medical teaching:

"For me I have got clinical for clinical practice and two or three days to teach undergraduate and postgraduate students." (Interview eleven)

"Because I am teaching staff I have to be knowledgeable to teach students." (Interview twenty-five)

6.3.3 Managerial work

Some doctors indicated that they have part or full time managerial work:

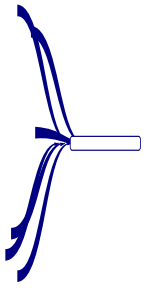
"I have got part time managerial work as a coordinator for the internship doctors where I prepare the schedules, distribute internship doctors over the hospitals and prepare the monthly follow up report." (Interview eighteen)

"Because I am the head of the unit I am responsible for keeping work going in the unit." (Interview twenty-five)

6.3.4 Doctors' information needs and the context of information needs

Doctors expressed different situations that give rise to a specific information need. Some of these situations linked to the work role they are engaged in. the context of information needs was divided into two broad sub categories: clinical practice and education as shown in figure (6.23).

Figure (6.21) The sub categories of information needs context



6.3.4.1 Clinical practice:

6.3.4.1.1 Medical decision:

Data show that doctors need information that can support them when making the choice of investigation, diagnosis and treatment, in other words at any stage of performing a medical procedure. Although doctors emphasised the importance of

experience when making clinical decisions, they indicated a need for information with less clear and complicated cases as shown in the quotations:

> *"My daily work as a doctor makes me in need of information as I sometimes encounter with cases that are rare or strange - not always - that makes it very difficult for me to manage such cases without getting information."* (Interview one)
>
> *"I prefer to use the medical book to make a quick decision so patients do not need to wait."* (Interview three)
>
> *"The patient has tuberculosis and probably he had lymphocytoma as well, so I needed to wait for laboratory information to decide the treatment."* (Interview twenty-five)

6.3.4.1.2 To confirm opinion:

> *"We thought that she had an injury which resulted in swelling that put pressure on the spinal cord I needed to confirm that to give her the right treatment... we had a discussion about her and only recent studies and up to date information can help to decide whether to go with that or not"* (Interview five)
>
> *"Although his decision might not be different from yours, he will confirm your opinion then you can decide with confidence."* (Interview six)
>
> *"I have got my opinion but I was not sure so I needed support to confirm my opinion as it is madness to do or say what you are not sure about."* (Interview twelve)

6.3.4.2 Education:

6.3.4.2.1 Teaching:

> *"In case I want to prepare to give a lecture for the team in the hospital of course I need information."* (Interview one)
>
> *"I need information sources to prepare a lecture."* (Interview three)

“I use CDs to get some information for my students.” (Interview twenty-five)

6.3.4.2.2 Studying:

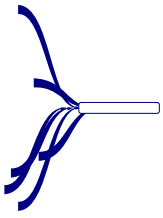
“At the time of exams of course I need information.” (Interview one)

“Information is important to pass in my education programme.” (Interview nine)

6.4 Motivation

This category covers the factors that instigated or gave rise to information needs; it refers to the beginning of the process of information needs. The main motivations that were identified: ambiguity, uncertainty, rare and new diseases and a multiplicity of options as shown in figure (6.21). Although there might be argument that ambiguity and uncertainty are the same, they are not similar and under each state different information might be needed. The differentiation between ambiguity and uncertainty was influenced by Schrader, Riggs and Smith (1993, p. 73-99). Uncertainty is associated with the problem of lack of information to judge the influence of intervention upon a given problem. On the other hand, ambiguity is associated with the problem of lack of clarity. When doctors face a problem, they might think that they are aware of what to do and what results they are seeking for but are not sure of the results of their intervention. In this case they are under an uncertainty state. On the other hand, if they are not pleased with their understanding of the problem and what is involved to sort the problem, in addition they are not aware of the results they are seeking for them in this case they are under an ambiguity state.

Figure (6.22) Sub categories of motivation



6.4.1 Ambiguity:

Ambiguity refers to a state when doctors are not aware what should be done, in other words it is a state when their minds go blank and have no direction to go in.

> *"Sometimes I encountered very vague cases where I find myself really need information."* (Interview one)
>
> *"Sometimes you face a case where you become confused and you need to read to get information which may help you with the diagnosis, but not necessarily with the treatment."* (Interview two)
>
> *"I felt as if I am in a dark place I was blocked I did not know what must be done at that time the case was very vague."* (Interview nine)

6.4.2 Uncertainty:

It is a state where doctors are not perfectly able to determinate the value and manage the situation they encounter they cannot guess the results of their decision.

> *"The specialist gives you an opinion although it might be like yours however, when you make your decision you would make it with confidence as you are sure the decision is correct."* (Interview six)
>
> *"When I searched the internet for information about the case that I had doubt about, I found a picture of a patient with symptoms almost the same as my patient symptoms I came to a diagnosis and confirmed it with one of the professors."* (Interview ten)
>
> *"I needed information because I was not sure that I can go with the surgical operation."* (Interview twenty-three)

6.4.3 Rare and new diseases:

"My information about the rare diseases is gray and I cannot depend on them so I need to get some information." (Interview one)

"I can depend on my experience with the common diseases but with the rare diseases you need to read or consult to get information." (Interview eleven)

"If the case is not common in Benghazi, in other words rare in this city, I have to search books journals and the internet to get information that I need to manage the case." (Interview fourteen)

"In addition to uncommon cases the rare diseases require getting information before you make your decision." (Interview twenty-three)

"I usually face different health problems and can make the decision straight away but there are some rare health problems which I may encounter once a year, such cases I need to consult the text book about." (Interview thirty-four)

6.4.4 Multiplicity of options:

"There was more than one diagnosis so I needed information to decide the most appropriate. I want to do the best for the patient." (Interview three)

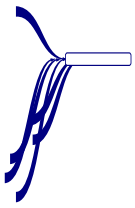
"There was more than one option so I wanted to get information to choose the best for the patient." (Interview ten)

"Fortunately the case was not acute and there were different options for treatment so I collected some information about them and get the most appropriate option for her." (Interview thirty-three)

6.5 Reason or purpose

This category covers the reasons for which information needs arise, in other words, this theme refers to the purposes for which information is used. The difference between motivation and reasons in this study is that motivation comes at the beginning of the process, the reasons are formulated later. The main reasons or purposes for which the information was needed included the following: updating, refreshing and continuing medical education, to answer a colleague question, to answer a patient question, to write a research paper and to know abbreviations and meanings as shown in figure (6.22).

Figure (6.23) The sub categories of the reason or purpose of information needs



6.5.1 Updating, refreshing and continuing medical education

"The nature of the work makes it imperative to be up to date and refresh your knowledge." (Interview fifteen)

"I usually surf the Internet in order to be up to date." (Interview twenty-three)

"Doctors always need information for refreshing and updating as there is something new out there." (Interview thirty-one)

6.5.2 To answer a colleague question

"If one of my colleagues asks me question I usually need information to answer him because our knowledge is usually equal and as he asked about the issue it usually would be as vague for me as him." (Interview one)

"I told them that the high blood pressure was not related to the problem in kidney function as it was fully functioning normal." (Interview six)

"Information sources help me to keep abreast of the development in the area" (interview twenty-three)

"If a junior doctor asks me question and I did not have the accurate information I will search to find information to answer his question." (Interview thirty-two)

6.5.3 To answer a patient question

"I want to answer his question he is my patient and he wants to understand the full picture." (Interview seven)

"Sometimes I need information to answer a patient or his relative's question." (Interview thirteen)

6.5.4 To write a research paper

> *"At the moment there is a study about Bahjat disease in the west of the country but because the disease is not as common there as in our district, so we need to collect the data and observe the response for the drug intervention and write a paper."* (Interview fifteen)
>
> *"I use different information sources through the internet, in addition to the medical books, to write a paper to be delivered in the department scientific forum."* (Interview three)

6.5.5 To know abbreviation meanings

> *"It is not only once or twice when I found abbreviation that I do not know what it stands for."* (Interview twenty-five)

6.6 summary

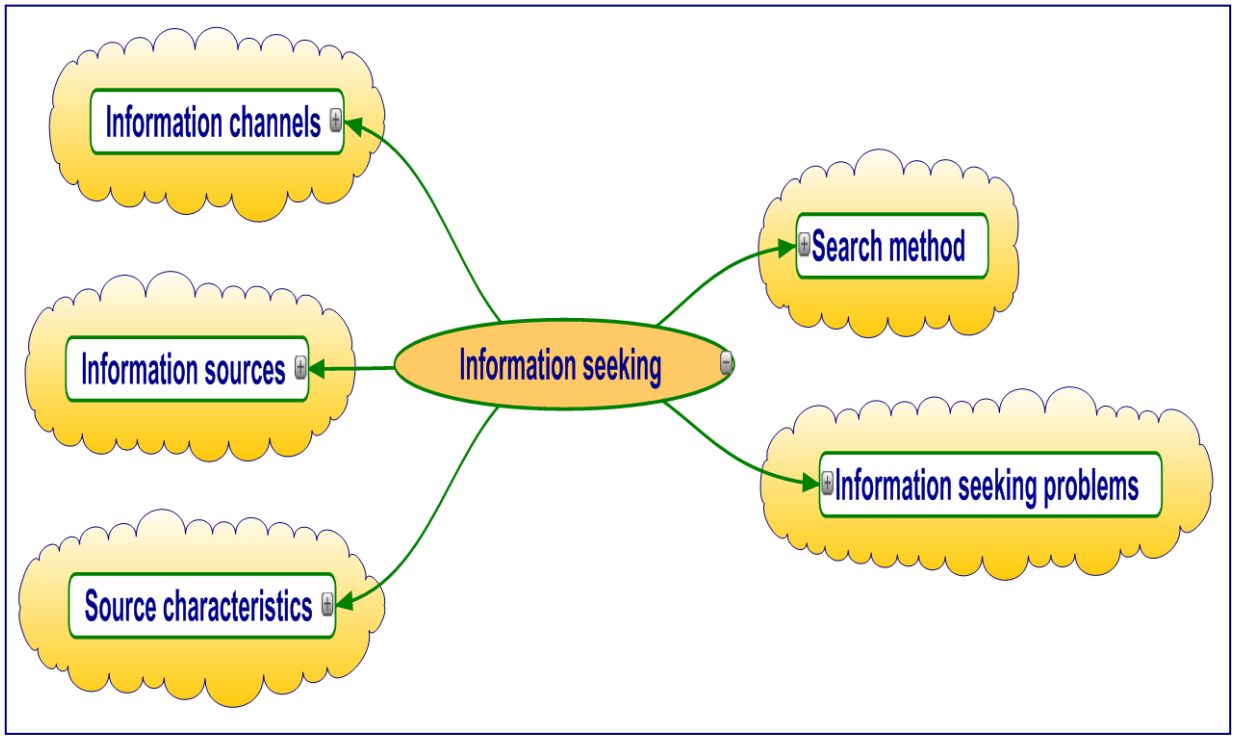
In summary it appears that qualitative data have reinforced some quantitative data and expanded some others. Furthermore the qualitative data provided information that may explain some quantitative data. With regard to doctors' information needs the qualitative data reinforced and expanded patient information to include: personal information; medical history of the patient; clinical images of the patient; the clinical results and family information. Qualitative data also expanded and organized the general health information to include: disease information; medical imaging and clinical laboratory testes information; treatment information; drug abuse; mechanism of recreational drug and the chemical substances in food. What is more, the qualitative data expanded and presented more organised information about managerial information including: medical guidelines; new medical developments; referral information and statistics. In addition the qualitative data provided information about the context as a higher level whiten which information needs was emerged. The context of information needs that was identified included: clinical practice and education. Finally the qualitative data provided further information about the motivations that gave rise to information needs and the purposes for which information was used.

Chapter seven Qualitative Results of Doctors' Information Seeking Behaviour

7.0 Information seeking behaviour

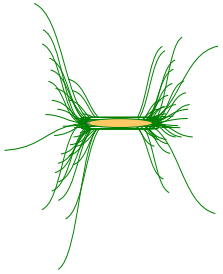
The qualitative data analysis of information seeking behaviour of Libyan doctors revealed different types of information seeking behaviours. However for the purposes of organisation, these findings were classified into five categories: information channels, information sources, source characteristics, search methods and information seeking problems. Figure (7.24) shows the main categories of information seeking.

Figure (7.24) Information seeking behaviour themes



The five main categories were divided more into subcategories as shown in figure (7.25). The majority of the terms in the covering headings of these categories and the concepts were derived from the main data as mentioned by the interviewees themselves. However, some of the ideas and concepts were clustered under covering headings suggested by the researcher and from the existing literature. These categories and concepts were presented in top down order, based on their frequencies by the interviewees. Furthermore, quotations from the interviewees are selected for each category to indicate the meaning and frequencies of information covered by the category.

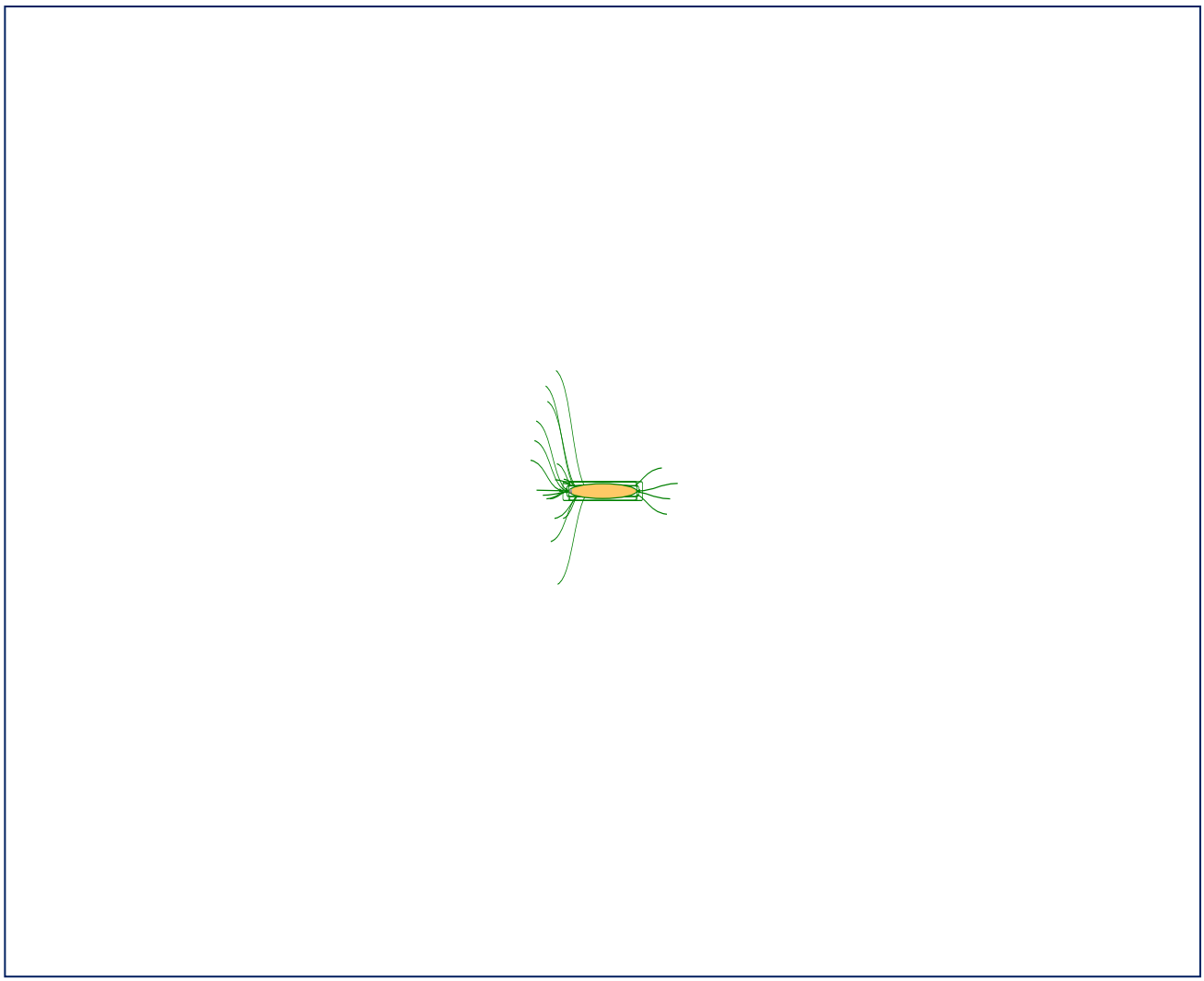
Figure (7.25) Subcategories of information seeking behaviour



7.1 Information channels

This category includes all types of means used by Libyan doctors to get access to information. The qualitative investigation shows that Libyan doctors use different information channels to access information that meets their needs. However, the different channels that were identified were clustered into subgroups as follows: Libraries, The internet, human sources, the morning meeting report, workshops, medical symposium and conference activities, seminars and group discussions, information sources from drug companies, personal computer, work place computer and telephone as shown in Figure (7.26). Furthermore, as mentioned, these categories and concepts were presented in the figure in top down order based on their frequencies as mentioned by the interviewees.

Figure (7.26) Information channels used by Libyan doctors



7.1.1 Libraries

Qualitative analysis shows that Libyan doctors use different libraries to access information to fulfil their information needs. The different types of libraries are ordered respectively based on their frequencies as mentioned by the interviewees. The libraries that were identified included the following libraries:

7.1.1.1 Personal library

> *"Usually when there is medical conference there would be a book fair held on the sidelines of the conference where I buy some books to go back to when I need to."* (Interview two)
>
> *"I have got my own books in my library." (*Interview eighteen*)*
>
> *"With regard to medical books I buy them from different libraries, I mean from my one library." (*Interview thirty*)*

7.1.1.2 The library of Libyan board of medical specialities

> *"I would prefer to go to the Libyan board of medical specialities than to the hospital library in order to get fast access to the internet as well as to get access to some medical journals."* (Interview seven)
>
> *"One of my sources that helps me to fulfil my information needs is the library of the Libyan board of medical specialities." (*Interview fifteen)
>
> *"The library of Libyan board of medical specialties has subscriptions with around seventy two titles in different medical fields. I go there to get access to these titles."* (Interview eighteen)
>
> *"Sometimes I go to the Libyan board of medical specialities to get some information there."* (Interview thirty-two)

7.1.1.3 Hospital library

"Although I usually get information from my one library, I use the hospital library where there are some good sources as well." (Interview twenty-three)

"For me the main source for information is the personal library, however sometimes I can find some information in the hospital library as there are some new books." (Interview twenty-five)

"Sometimes I would go to the hospital library as some doctors download some new sources and put them in the hospital library." (Interview twenty-eight)

"Some doctors have subscriptions with some journals and they bring their copy to the hospital library." (Interview thirty-two)

7.1.1.4 Medical faculty library

"I get access to some medical books and particularly the medical journals from the library of the medical university." (Interview five)

"I use the library of the medical faculty to read the medical journals." (Interview eleven)

"To some extent I can get some books from the library of the medical university." (Interview twelve)

7.1.2 Human sources

This category covers all types of information that Libyan doctors obtain by communicating with other people, such as colleagues, specialists and consultants and other medical experts, in formal way or informal way either from the country or from outside the country. This category is mentioned here as a channel to access information and the different types of human sources that were identified are presented in detail under the covering heading information sources.

"It is very common in medicine to consult people." (Interview three)

"The lecturer gives me organized information which makes it easy to be understood and easy to remember." (Interview nine)

"I may present the patient case to my colleagues and every one of them could provide some information based on his long experience." (Interview twenty-five)

"In daily work we depend mainly on the senior staff to acquire knowledge and fulfil our information needs." (Interview thirty)

7.1.3 The Internet

The internet is presented here as a way to access different kinds of information sources, as the internet is a way of connecting likes the library. It is used as a channel to access information sources such as books and websites. However, the sources that were accessed via the internet and considered as the end source that gives information are presented in more detail under the covering heading 'information sources'.

The qualitative analysis shows that Libyan doctors access the internet through private connections in the home and in the internet cafe or through the work place connection as indicated in the selected quotations:

7.1.3.1 In home and the internet cafe

"I consult the book in the first place as it is closer to me then I go to the internet cafe to get access to more recent and detailed information." (Interview two)

"When I have got enough time I go to the internet cafe to get access to information." (Interview seven)

"I searched the internet and I found an image exactly the same as my patient." (Interview ten)

"In fact I have never tried to log in to the internet from the hospital as I am used to the fast connection from my home." (Interview nine)

"I use the internet to get access to the most up to date information it is my favourite source for that particular reason." (Interview twenty-one)

1.3.2 In work place

"... In addition to that I can get access to the internet from the hospital." (Interview six)

"Although I have got access to the internet from my home, I can get access from the hospital as well." (Interview twenty-three)

"Before I had to go to external sources to get access to the internet but now we have access from the hospital." (Interview thirty-two)

7.1.4 The morning meeting

This category covers information acquired about specific patients as well as information regarding medical knowledge in general. That information is obtained by attending a daily meeting between the senior and junior staff in the clinical departments in the hospitals. These meetings usually take place to discuss patient cases and to establish a particular procedure for the clinical practice. The following quotations from doctors indicate the nature of this category:

"In the morning report there is discussion about some cases after the admission and the consultants give detailed explanations about the interesting cases which is really helpful." (Interview twenty-eight)

"The daily work in this hospital starts with the morning meeting where we get information about the patients who were admitted last night and the emergency cases. In this meeting I usually get some new information from the other consultants and specialists." (Interview thirty-three)

"As a consultant I get some information about the patients in the morning meetings where we discuss the cases that were managed by the night shift doctors and the complicated cases that were faced in the rounds." (Interview thirty-four)

7.1.5 Workshops

This category includes all types of information acquired by doctors when they attend organised sessions or meetings to discuss a particular topic by experts as indicated by the selected quotations from doctors:

"One of the sources that help me to get access to information is the workshops that are held either by the medical university or the Libyan association for rheumatic doctors." (Interview fifteen)

"For me I attended some workshops about particular topics which were held in the past by different organisations and I have got some information from them." (Interview twenty-five)

"In this hospital always there are workshops where some experts bring a particular drug. For example one of those experts brought a drug for postnatal bleeding. He gave us full information about the drug as well as giving us information about this kind of bleeding, its types and how to control such bleeding. It was one day but full of activities and information." (Interview thirty-two)

7.1.6 Medical symposium and conference activities

"I have attended several local conferences in the country and a few international conferences where I got some good up to date information." (Interview eighteen)

"In the conferences you can listen to other people to know what is going on and you can talk with some others and ask them to acquire some knowledge from their experience." (Interview twenty-five)

"I can benefit from the medical conferences where I can get access to some experts and ask the lecturers if they can give me a copy of their research paper on my flash memory." (Interview thirty)

7.1.7 Seminars and group discussion

This category includes all types of information that is accessed when people are assigned to work under supervision to be presented in front of other colleagues and experts for public benefit. The following quotations indicate the type of data that is included in this category:

"In our department the digestive system and endoscopy we have two days weekly, Monday and Thursday, where intern doctors and resident doctors are usually given topics to be discussed with the senior registrars, specialists and consultants we get valuable information from these seminars." (Interview one)

"After the morning rounds usually we have a day or two every week where some postgraduate students would prepare a topic to be presented and discuss it with them and this is one of our sources to get information." (Interview fifteen)

"In the hospital we give the postgraduate students topics to prepare a paper about and present it for the other group and every one of us gives his notes so that all get benefit." (Interview eighteen)

In addition to the above categories of channels that were identified as more common based on their frequencies of mentioning by the interviewees, there are others less common. The following were identified as less common:

7.1.8 Information sources from drug companies

"Some of the drug companies provide us with journal articles about their drug which give us scientific information." (Interview fifteen)

"Usually the big drug companies collect the majority of information sources that were written about their drugs and provide them to us and I read and get benefit from what is important to me." (Interview twenty-five)

7.1.9 Personal computer

The personal computer was identified as the most common equipment that doctors use to access digital information either from the internet and online international databases or to browse other types of digital information such as pdf files as indicated in the quotations:

"I have got my laptop where I have a small database to get access to some information sources that I collected from different sources." (Interview one)

"It is very easy to get access to information on my computer it saves my time." (Interview thirty-four)

7.1.10 Work place computer

Although accessing digital information using a personal computer was more common, work place computers were identified as another medium to access digital information:

"There are about eight computers in the hospital I use them to log in to the internet or to check some electronic sources that I already have. However it is not available whenever you need information as it may be busy." (Interview six)

"I sometimes use the hospital and Libyan board computers but not always as there are not enough and are not in our department." (Interview eleven)

7.1.11 Telephone

The mobile telephone was identified as one of the channels that is used by Libyan doctors to access information sources by surfing the internet or electronic

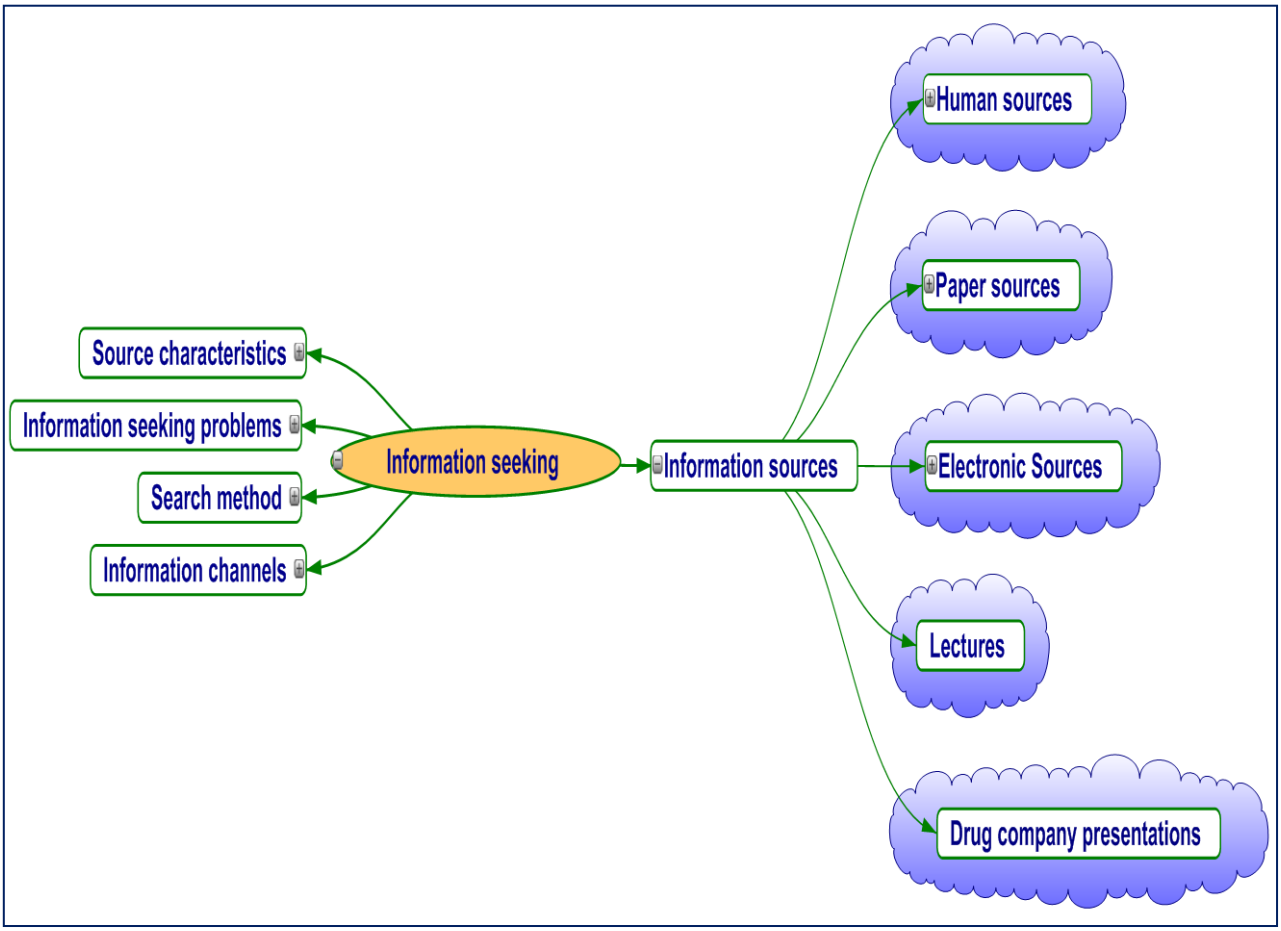
information sources in different formats particularly images and pdf files: as indicated by the quotations from doctors:

> *"When I am on my journey back to my city I surf the net on my mobile if there is signal but if there is no signal I search the files that I have downloaded previously to get some information."* (Interview five)
>
> *"I have got internet access on my mobile so I can search the internet any time and everywhere."* (Interview fourteen)
>
> *"I have some medical books and articles as pdf files on my mobile phone."* (Interview fifteen)

7.2. Information sources

This category includes the different sources that were identified as the sources that doctors can obtain information from. A wide variety of information sources was highlighted as sources to fulfil doctors' information needs. However the different types of information sources were clustered under five main categories: human sources, paper sources, electronic sources, lectures and drug company presentations, as shown in figure (7.27). The first three categories were divided further. Details about the sub categories are provided later under the covering heading for each of them, as well as quotations from doctors to indicate the type of data under them. Furthermore, these categories are presented in rank order based on frequencies of mention by the interviewees.

Figure (7.27) The main categories of information sources



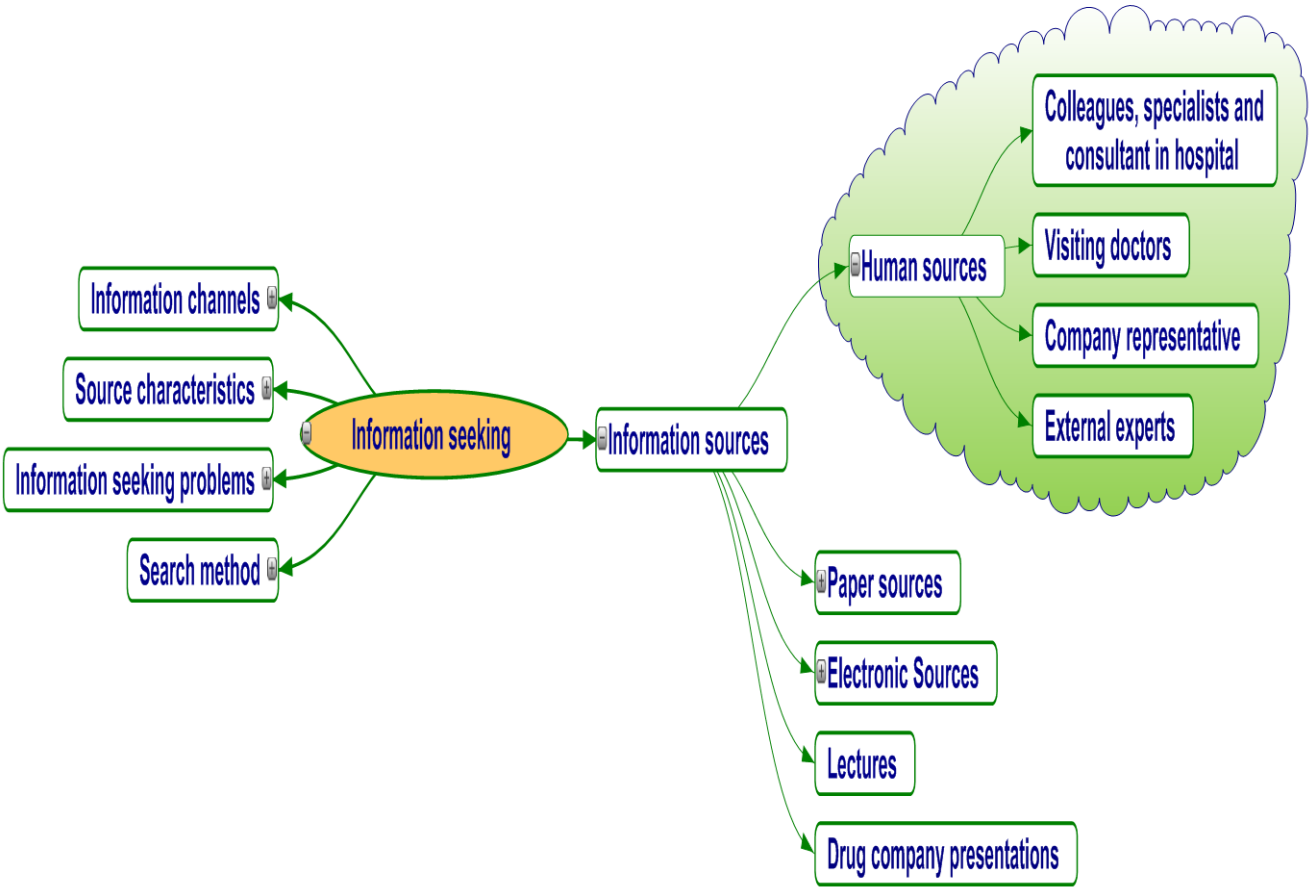
7.2.1 Human sources

Different kinds of human sources were used by doctors to fulfil their information needs. However, only people who have a medical qualification to

practise as a doctor and practising inside the country are coded under this theme and the other human sources that were identified such as company representative, medical experts from outside the country were coded under separated themes. The main reason behind this classification is to indicate the type and location of the human sources and to give a richer picture about Libyan doctors' information seeking behaviour.

The human sources that were identified included: colleagues, specialists, consultants, visitor doctors, company representatives and the consultation with the medical experts from outside the country as illustrated in figure (7.28).

Figure (7.28) Human sources consulted by Libyan doctors



7.2.1.1 Colleagues, specialists and consultants in hospital

Colleagues, specialists and consultants are considered to be a rich, approachable and convenient source of information that could meet doctors' information needs, as doctors believe that they might have encountered the same

problem before. Furthermore, from their experience they can give information that can be applicable in the course of patient management.

> *"My colleague may have experienced such a case and he will give me what I need."* (Interview ten)
>
> *"I can ask one of my colleagues or the consultant to confirm my decision."* (Interview twenty)
>
> *"The consultant and the specialist give you the total of their experience they are senior and have more experience than me."* (Interview twenty-one)
>
> *"The specialist and consultant give you more applicable information for the patient case as they have experience and they would know the patient conditions and the disease progress. They give you accurate information easier than you can get from the medical books."* (Interview thirty-two)

Doctors emphasise that in acute cases colleagues, specialists and consultants are the first source for fast access to information:

> *"If the patient case is acute the first source for information is the senior doctor… after that I searched the internet to get up to date information."* (Interview twenty-one)
>
> *"The first one I consult is the collage and the consultant if the case is an emergency then later on I can read a book and search the internet for recent information."* (Interview twenty-three)
>
> *"If I do not have time and the case was urgent I ask one of my colleagues, and after we manage the case I would search the information sources, particularly books and the internet, to get access to more information about it."* (Interview thirty-one)

However doctors believe that their colleagues sometimes are not accessible at the time of need, or they cannot benefit as their information is equivalent, particularly with rare and new diseases:

> *"I have consulted some of my colleagues but the information they gave me was equivalent to mine."* (Interview one)

“Sometimes they are busy lecturing or doing their work therefore you cannot access them at the time of need.” (Interview six)

“The problem is that sometimes you cannot access your colleagues at the time.” (Interview seven)

“Due to the lack of information sources your colleagues may not be helpful and they would tell you what you already know.” (Interview twenty-five)

7.2.1.2 Visiting doctors

Doctors consider visiting doctors a valuable source to acquire up to date information, as visiting doctors offer their experience to share with others.

“From time to time we invite doctors from famous universities and they give us the benefit of their experience in the field.” (Interview eleven)

“There are different activities which we consider as a rich encyclopaedia that give us the needed information such as the visitors who give helpful information.” (Interview fifteen)

“There are many visitors who come from outside the country who are highly qualified and we discuss the critical cases with them… as they have access to more recent publications through their organisations. They provide us with the most up to date information in addition to their experience.” (Interview thirty-four)

7.2.1.3 Company representatives

Company representatives particularly pharmaceutical companies were identified as one of the information sources for doctors, as representatives give detailed information about their products and quote from different research and papers that addressed their product. Furthermore they give information about similar products from other companies. This is considered a rich source for doctors to be up to date.

"At times a company sends someone to give information, for example, regarding the use of Botox for the purposes of wrinkle removal, or to give information about skin cell cultivation." (Interview two)

"The company representative gives me information about their drug such as its formula, the side effects and the price and where it is sold." (Interview twenty)

"Usually when there is a new treatment, which is better than the others, the representative will give you information to show the advantages of their treatment." (Interview twenty-two)

"The representative will give me all what I want about their medicine the good things mainly; however I have to search more to know the negative side of their medicine." (Interview twenty-five)

7.2.1.4 Contact with external experts

This information was mentioned by only two doctors, however it is worth mentioning as a source of information for Libyan doctors as the researcher has had informal conversations with other doctors who were not participating in the qualitative part of this study. They mentioned such a source and confirmed that many doctors have contacts with doctors from outside the country:

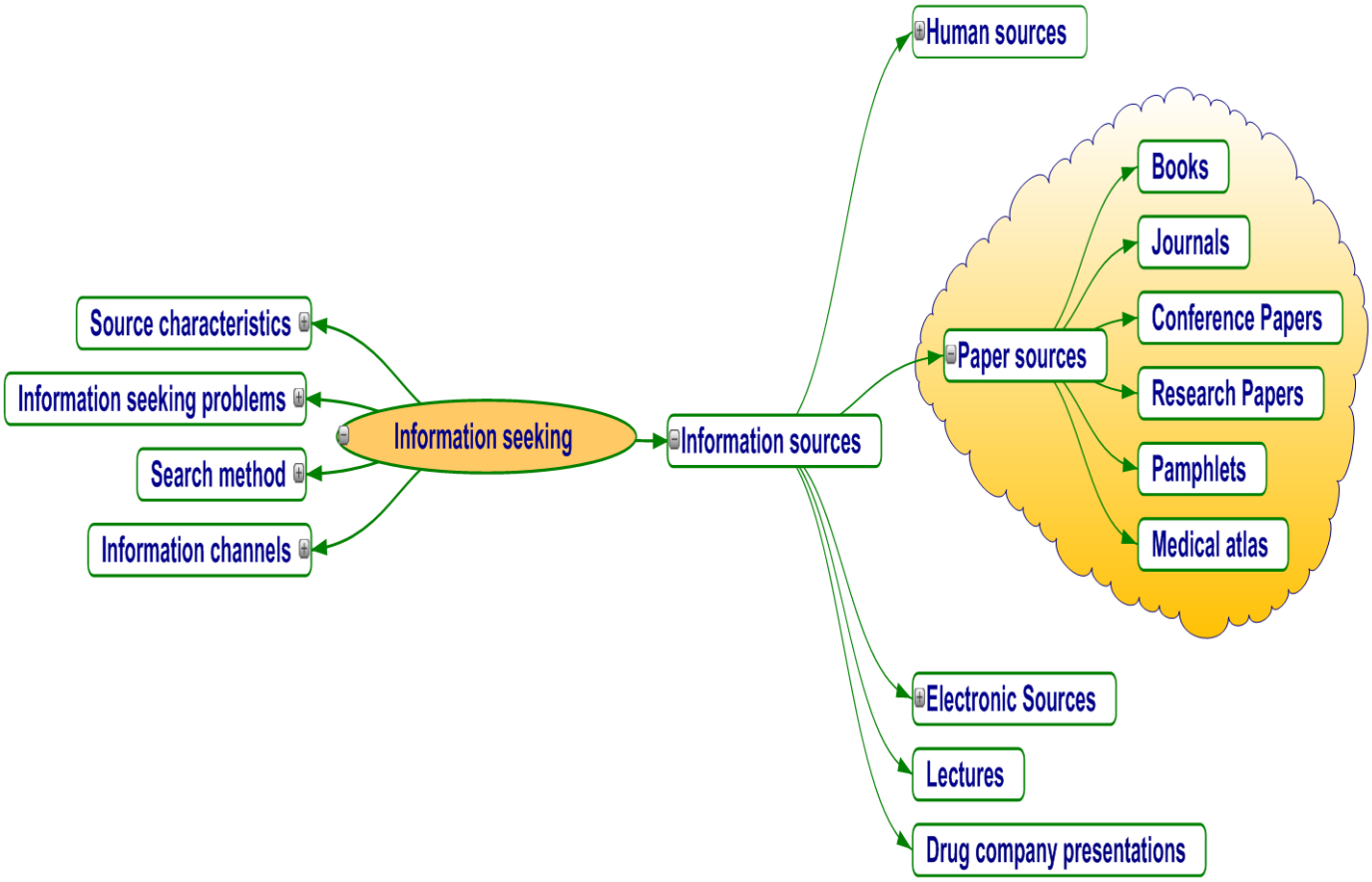
"We consulted highly professional experts but they give us what we already have, in other words their decision was the same as ours." (Interview twelve)

"I have got a connection with some consultants in the UK where they provide me with fundamental information, if I encountered a real problem I call them and they give me what can fulfil my need as they have better access to information." (Interview thirty-four)

7.2.2 Paper sources

Qualitative analysis shows that Libyan doctors use different paper sources to fulfil their information needs. The paper sources that were identified are shown in figure (7.29)

Figure (7.29) The paper sources used by Libyan doctors



7.2.2.1 Books

Data from interviews demonstrated that books, whether text books or hand books, were the most profoundly used as a source or reference to fulfil doctors' information needs. Doctors believe that books are authoritative to be used in the course of patient management. The quotations point towards the utilization of books:

> *"I depend mainly on the medical books as it is easy to get what you want from the book compared to electronic sources."* (Interview eight)

"The book is indispensable you cannot ignore it as medical journal information, even if your information is new as there is no doubt about the medical book information you can take such information with close eyes." (Interview twenty-five)

"I can pick up a book and read about the disease and its symptoms for example." (Interview twenty-six)

"In medical specialities usually there is a text book which is considered the main reference which is updated from time to time, so for me as a paediatric the main reference is Nelson Textbook of Paediatric and there are some other books that I use in case I need to get information." (Interview twenty-nine)

7.2.2.2 Journals

Data show that the medical journals are one of the information sources used to fulfil Libyan doctors' information needs. Doctors use them more to be up to date. The following quotations indicate the utilization of medical journals:

"For me I usually use the American or the British journals to be up to date or in case I needed information for the purposes of investigation and diagnosis." (Interview fourteen)

"The second source for me is the medical journals I personally have a subscription in the Analysis of Aromatic Diseases." (Interview fifteen)

"I consult the Libyan journal and the Saudi journals as sometimes there is difference between us and the rest of the world regarding the symptoms of some diseases and some types of diseases are local I mean they are in our area but they do not exist in Europe or America." (Interview seventeen)

7.2.2.3 Conference papers

> *"If I needed to make comparison I go back to conference papers."* (Interview fourteen)
>
> *"I access conference papers through some organisations that I am already member with, conference papers help me to be up to date."* (Interview thirty-four)

However, some doctors mentioned that they can neglect the conference papers as they believe that the new contributions in the conference papers definitely will make their way to the medical journals, so they can replace conference papers with journals:

> *"There is no doubt of the importance of conference papers, however it might be replaced with journals as the new contributions will be published in journals later on."* (Interview eleven)

7.2.2.4 Research papers

> *"The research papers come to us from drug companies and some other organisations that conduct a research work about a particular disease or drug. These pieces of research inform me about what is going on."* (Interview fifteen)
>
> *"The different research papers inform me about the current research about for instance a particular drug; it shows you whether you can use it or not."* (Interview sixteen)

Although research papers are considered one of the information sources that can help doctors to meet their information needs, some doctors believe that both conference papers and research papers in general are ongoing studies, which means it is not yet authoritative and accurate enough to be applied in daily practice. However, they believe that they can be used for the purposes of being updated and research:

"I use research papers to make comparisons between my research and the previous research to find out the differences." (Interview two)

"I do not use information from research papers with emergency cases; I use such sources to be more up to date to know what is going on in the field." (Interview thirty)

"We avoid using conference and research papers in general in daily practice as they can give you information to be up to date but it is not documented and authorised to be used in daily practice." (Interview thirty-four)

7.2.2.5 Pamphlets

Although pamphlets were identified as one of the paper sources that can meet doctors' information needs, they concern doctors. They think that companies (as authors) will mention the positive things about their products and omit the negative ones, although they use them for some information they are still concerned about them

"... The drug companies give us pamphlets about the drugs and you can find information about their products in such pamphlets." (Interview fifteen)

"As there may be new drugs the pamphlet of the drug gives me some information about the drug that I intend to use but I have to compare with what is in books and journals." (Interview sixteen)

"I think pamphlets are commercial more than scientific; you can get general information from them but you cannot depend upon them." (Interview eighteen)

7.2.2.6 Medical atlas

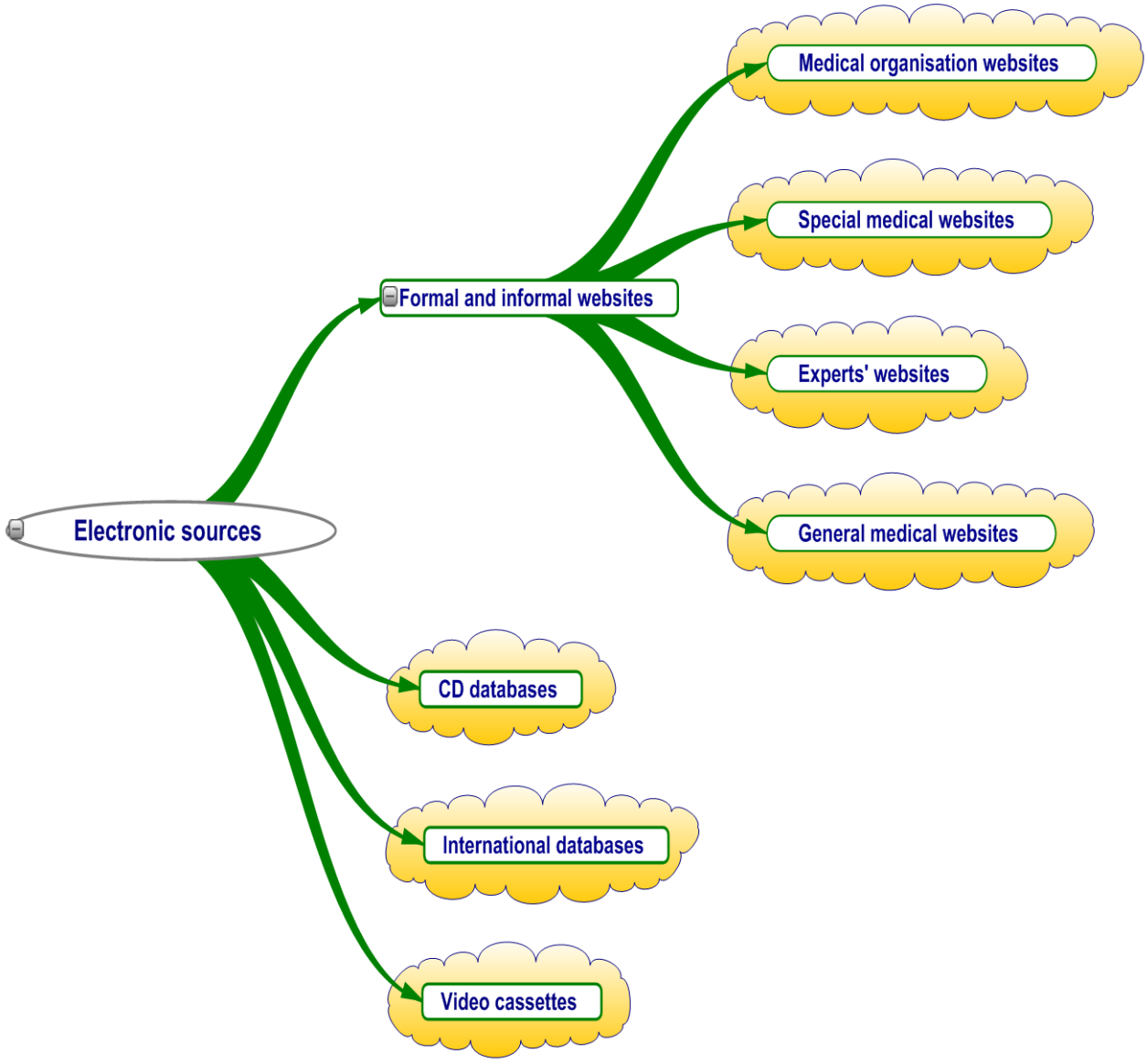
A medical atlas is worthy of being considered as a one of the sources used by doctors to meet their information needs, though it is mentioned by only one doctor. However, he is a consultant who has long experience in practice and teaching staff at the medical university, furthermore one of dermatologists referred to the importance of images in their speciality, so perhaps it is common but not recognised:

> *"Sometimes you face a patient with a skin rash and perhaps I forget this symptom so when you browse the medical atlas you can get a picture for the same disease it is very valuable."* (Interview twenty-five)

7.2.3 Electronic sources

Electronic sources were clustered under four sub themes: formal and informal websites, international databases, CD databases and video cassette. This classification was intended to show in detail the types of electronic information sources used by Libyan doctors to fulfil their information needs. Analysis showed that Libyan doctors used both internet and electronic databases to access information that met their information needs. However the usage of the internet was more common than electronic databases. The different electronic sources that were identified are shown in figure (7.30)

Figure (7.30) Electronic sources used by Libyan doctors



7.2.3.1 Formal and informal websites

This theme includes all types of the websites that are accessed through the internet to get information. Data show that Libyan doctors use the internet to log into different websites to fulfil their information needs. The different websites used can be classified under four main types as indicated by the quotations under each type:

7.2.3.1.1 Medical organisation websites

> *"I log into American College of Rheumatology; it gives me links and recent news in the field of rheumatology."* (Interview fifteen)
>
> *"I have got a subscription with the British Medical Association where I can get access to a lot of beneficial sources."* (Interview thirty-four)
>
> *"We usually log into the internet to access WHO (World Health Organization) guidelines for infectious diseases particularly HIV disease, the CTC classification (Centre for Control of Infectious Diseases) and the CCO (Clinical Care Options) of hepatitis."* (Interview twenty-nine)

7.2.3.1.2 Special medical websites

> *"I use the FDA website (US Food and Drug Administration) as it is approved and authentic."* (Interview seven)
>
> *"When I cannot find information that I need in books, I usually use Up To Date as it is a comprehensive database... I have a subscription with a website called Medical Doctors they send me articles related to heart disease."* (Interview eight)
>
> *"I always log into the Medscape website... in addition I use Up to Date on a weekly basis."* (Interview fifteen)

"There are some websites specialised in medical education particularly examination and questions and answers although they are more for postgraduate students and the Fellowship of Royal Colleges of the UK, the USA and the Arabic Fellowship still we can get some beneficial information." (Interview thirty-four)

7.2.3.1.3 Experts' websites

"I have got a connection with some experts I just log in to their websites and I can get benefit from their experience and the links on their websites." (Interview thirty-four)

7.2.3.1.4 General Medical websites

"There are some general websites which do not require a subscription to log into, these are usually built for people in places with poor information technology infrastructure, at such sites I can get access to some good sources." (Interview five)

However, although the latter two types of websites (experts and general medical websites) were shown to be less common than the first two types (the medical organisation and special medical websites), they are still types of sources used by Libyan doctors to access information.

7.2.3.2 CDs databases

Many doctors indicated that they have some types of databases on CDs which they use to fulfil their information needs. Some of these CDs are collections of medical materials that they gather from different sources particularly the internet, some are electronic books on CDs and some of them are databases containing different sources from a database developer as indicated by the following quotations:

"I have got up to date on CDs and after the morning round I use my lap top to browse these CDs to find some information." (Interview one)

"I have got database on CDs and many electronic sources on CDs they are helpful." (Interview fifteen)

"I sometimes attend a conference where they distribute CDs; as well some books are published on CDs. In addition you can find some lectures on CDs; these are the types of sources that I usually use to fulfil my information needs." (Interview twenty-five)

7.2.3.3 International databases

"When I cannot find information that I need in books, I usually use the Up To Date database as it is comprehensive database." (Interview eight)

"I use Up to Date on a weekly basis and some of our colleagues who study abroad they send us their username and password and we get access to many online databases." (Interview fifteen)

"I used to log into Medline but now there is problem of subscription." (Interview eighteen)

"To be honest we get access to some online databases through our friends who work and study abroad we use their personal details and it is ok." (Interview thirty-four)

7.2.3.4 Video cassette

"I use video cassettes to teach students anatomy. However when I watch expert anatomy, particular organs, it helps me remember some details I forgot." (Interview twenty-five)

7.2.4 Lectures

Qualitative analysis shows that Libyan doctors obtain a lot of information from public lectures that are held more often as an informational activity in their hospital or in the Libyan board of medical specialities.

> *"In this hospital every week or ten days there is lecture where I get a lot of information that helps me."* (Interview thirty-two)
>
> *"Sometime we attend lectures to get information, although it's beneficial there is no fixed schedule for lectures."* (Interview seven)
>
> *"For me the lectures are the preferred source to get information whether recorded on any medium or live from the person as they give you applicable information for the patient."* (Interview nine)

7.2.5 Drug companies presentations

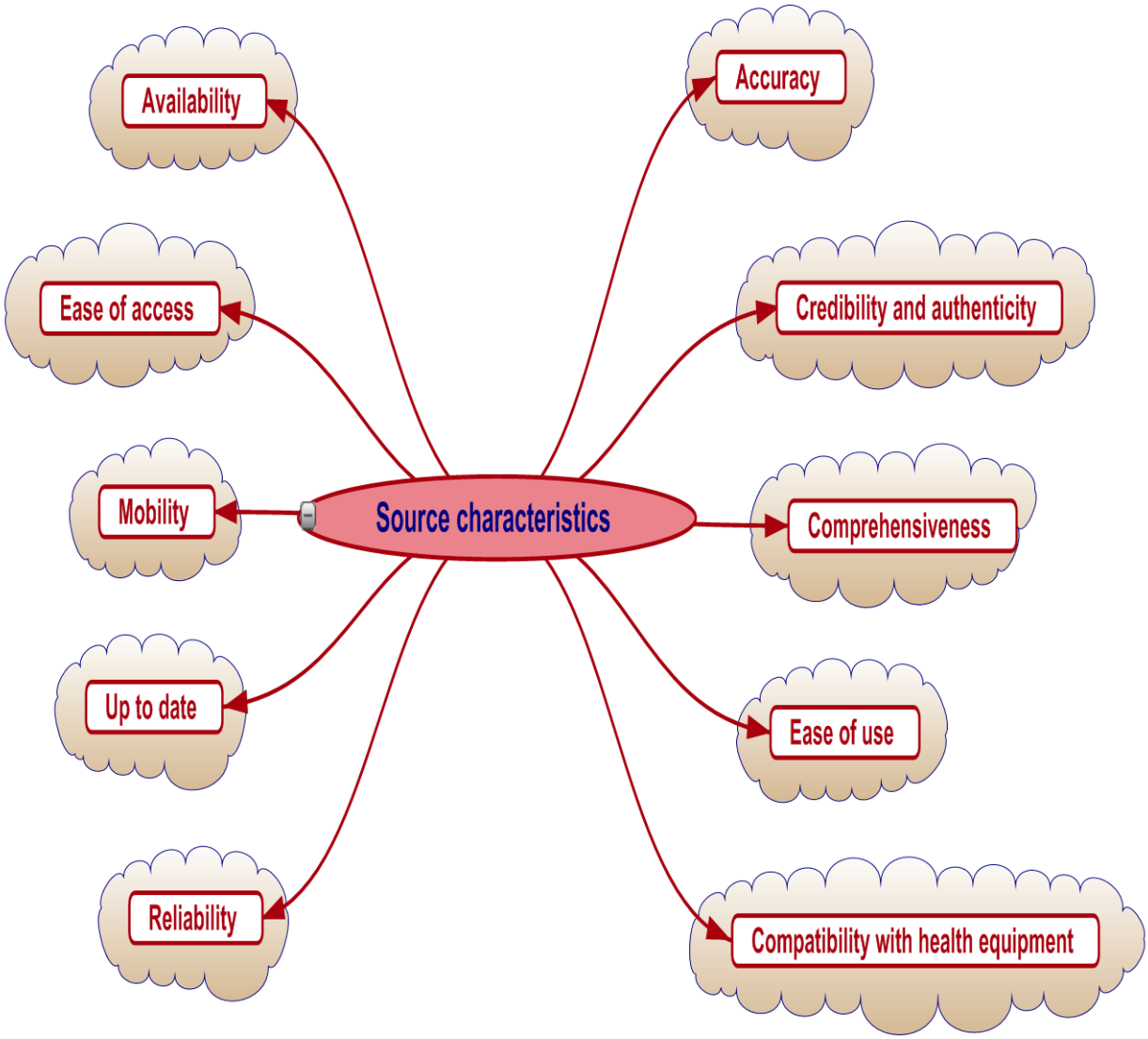
Doctors believe that they access valuable information through the drug companies' activities, such as presentations. They think that the drug companies provide them with up to date information about their new products, particularly drugs.

> *"One of the companies' activities is the presentation, where the companies come to give information about their drug and we get benefit from this activity."* (Interview two)
>
> *"Because there usually new drugs the different companies come and present their medicine and provide us with rich information about their products."* (Interview fifteen)
>
> *"The companies come from time to time and make presentations."* (Interview twenty-five)

7.3. Sources' characteristics

This theme indicates the criteria that doctors believe influence their use of different information sources. These source characteristics are shown in figure (7.31), in addition some quotations from data to support and indicate the meaning and the type of data covered by each pattern are provided under each pattern.

Figure (7.31) Information sources' characteristics



7.3.1 Availability

> *"For me information sources should be available and accessible from the department."* (Interview two)
>
> *"I was faced with cases where I was not sure about them and the investigations that I had to order, however I consulted senior doctors and when I went back home I read a book about the case and surfed the internet as well and the main reasons for using these sources were the availability and easiness."* (Interview four)
>
> *"I use these sources because they are available for me."* (Interview fourteen)

7.3.2 Ease of access

Doctors consider ease of access one of the key factors that influence their use of information sources. Data from interviews demonstrated that doctors did not use some information sources due to some access difficulties, though they was available in the hospital, as indicate the following quotations:

> *"I use medical books as they are easy to access."* (Interview three)
>
> *"I think information sources should be located and accessed from the department as we spend most of the time in the department."* (Interview four)
>
> *"I wish there were a network just for dermatology that can provide me with accurate and up to date information and to be able to access that network everywhere."* (Interview seven)
>
> *"The internet is accessed through the administration building or the hospital library and both of them are away from the department. I cannot leave the patient waiting to go and use the internet at the time of need."* (Interview ten)

7.3.3 Mobility of the source

Data indicate that doctors want sources that can help them to access information whenever and wherever they need information; they need a source that can be moved with them wherever they go, as stated the quotations:

> *"The book is always with me."* (Interview one)
>
> *"When I am on my journey back to my city I surf the net on my mobile if there is signal but if there is no signal, I search the files that I have downloaded previously to get some information."* (Interview five)
>
> *"We need something that makes it easy to access information quickly from colleagues and the consultants using, for example, the pager network which is already in the hospital but not used."* (Interview seven)
>
> *"I think there should be a connection with the internet using the mobile so that I can login and search for information whenever and wherever I need it rather than waste an hour or two here and there."* (Interview thirty-three)

7.3.4 Up to date

> *"I have got a medical book; it is Current Medical Diagnosis and Treatment. It is published yearly and I use the current (recent) edition to get up to date information."* (Interview eight)
>
> *"There are some information sources in the hospital but not up to date, some from 2003, you know sources must be up to date."* (Interview ten)
>
> *"There are some sources, particularly journals until 2007, however it should be up to date, two years back is too much."* (Interview fourteen)

7.3.5 Reliability

Reliability means that an information source can perform properly at the time of need; in addition it can be relied on with confidence to provide the wanted information consistently:

> *"I prefer to depend on the consultant's opinion more than any other resources as he has practical experience in his field."* (Interview one)
>
> *"The most important factor is to have a system that you can rely upon, not a system that at the time of need crashes."* (Interview fifteen)
>
> *"The research and the conference papers such sources you cannot rely on them to treat particular disease as they are ongoing research, unless it is published in the main text book in the field."* (Interview twenty-three)
>
> *"I do not want to be surprised that the computer is broken and we cannot access information."* (Interview thirty-four)

7.3.6 Accuracy

Accuracy refers to whether an information source can provide adequately efficient information that can fulfil their information needs.

> *"The consultant gives you accurate information that is related to the patient as he may have faced the same case before."* (Interview one)
>
> *"… Because he is more knowledgeable than me he will give me the thread I mean accurate information."* (Interview nine)
>
> *"In the first place I must find accurate information."* (Interview twenty-one)

7.3.7 Credibility and authenticity

Credibility refers to a source that is capable of being believed. Authenticity here refers to whether the source is valid, qualified and so entitled to be accepted and be applied. Data showed that doctors consider credibility and authenticity

important attributes that influence the use of different information sources, particularly in the course of patient management.

> *"I use the medical text book in the first place because not everything is written in such books. They contain only the one hundred percent sure information. In other words what is in the textbook does not change."* (Interview two)
>
> *"I try to use journals that have a high impact factor. I mean the number of citations of the journal is high."* (Interview nine)
>
> *"The medical books are still the main source as they are credible and authentic."* (Interview eleven)
>
> *"The book is the first source, it is authentic. I can trust it more than the other sources."* (Interview thirty-three)

Although the data do not provide clear evidence that indicates how Libyan doctors judge the credibility and authenticity of the sources, it can be extracted from data that publisher and the experience of the doctors are one of the key factors to judge the credibility and authenticity.

> *"If the specialist or my colleague gives me information that does not convince me one hundred percent, I consult the medical books."* (Interview twenty-three)
>
> *"We are affected by the British school so we trust the Royal College, in addition to some accredited organisations in the UK, the USA, and Canada which are the most highly recognised in the world."* (Interview thirty-one)
>
> *"There are international organisations such as British college, American colleges and the Canadian colleges such organisations have high quality criteria for publications so that their publications are authentic and credible... I just know from the writer I can judge if it is good or not"* (Interview thirty-four)

However, the sources that no one negotiated for the credibility and authenticity were the medical books, particularly the reference ones in each speciality.

> *"In medical specialities usually there is a text book which is considered the main reference which updated from time to time, so for me as a paediatric the main reference is Nelson Textbook of Paediatric and there are some other books that I use in case I need to get information."* (Interview twenty-nine)
>
> *"The book is indispensable you cannot ignore it as medical journal information. Even if your information is new, there is no doubt about the medical book information you can take such information without reservations."* (Interview twenty-five)

7.3.8 Comprehensiveness

Comprehensiveness indicates that the source has the characteristic of including all information about the different aspects of a topic, for instance a source provides comprehensive information about a disease and its causes, symptoms, methods of diagnosis and investigations and how to treat the disease. Data indicates that this is one of the attributes that motivate using the different information sources:

> *"The Up To Date gathered what was scattered in the other sources."* (Interview one)
>
> *"I usually use Up To Date as it is a comprehensive database."* (Interview eight)
>
> "*Journals are not like books; they give details but not everything about the disease, perhaps new things to be up to date but not everything."* (Interview twenty-five)

7.3.9 Uncomplicated systems and technologies (ease of use)

"There should be a simple system where you can enter the patient age and his symptoms. Then it gives me the different options and the appropriate diagnosis." (Interview six)

"I wish they could collect all the sources related to dermatology and place them in one source… so if I need information about Eczema for instance I log into such a network and search one place rather than it being scattered and dispersed between different networks." (Interview seven)

"Doctors wish to have an uncomplicated system that helps to access information easily." (Interview fifteen)

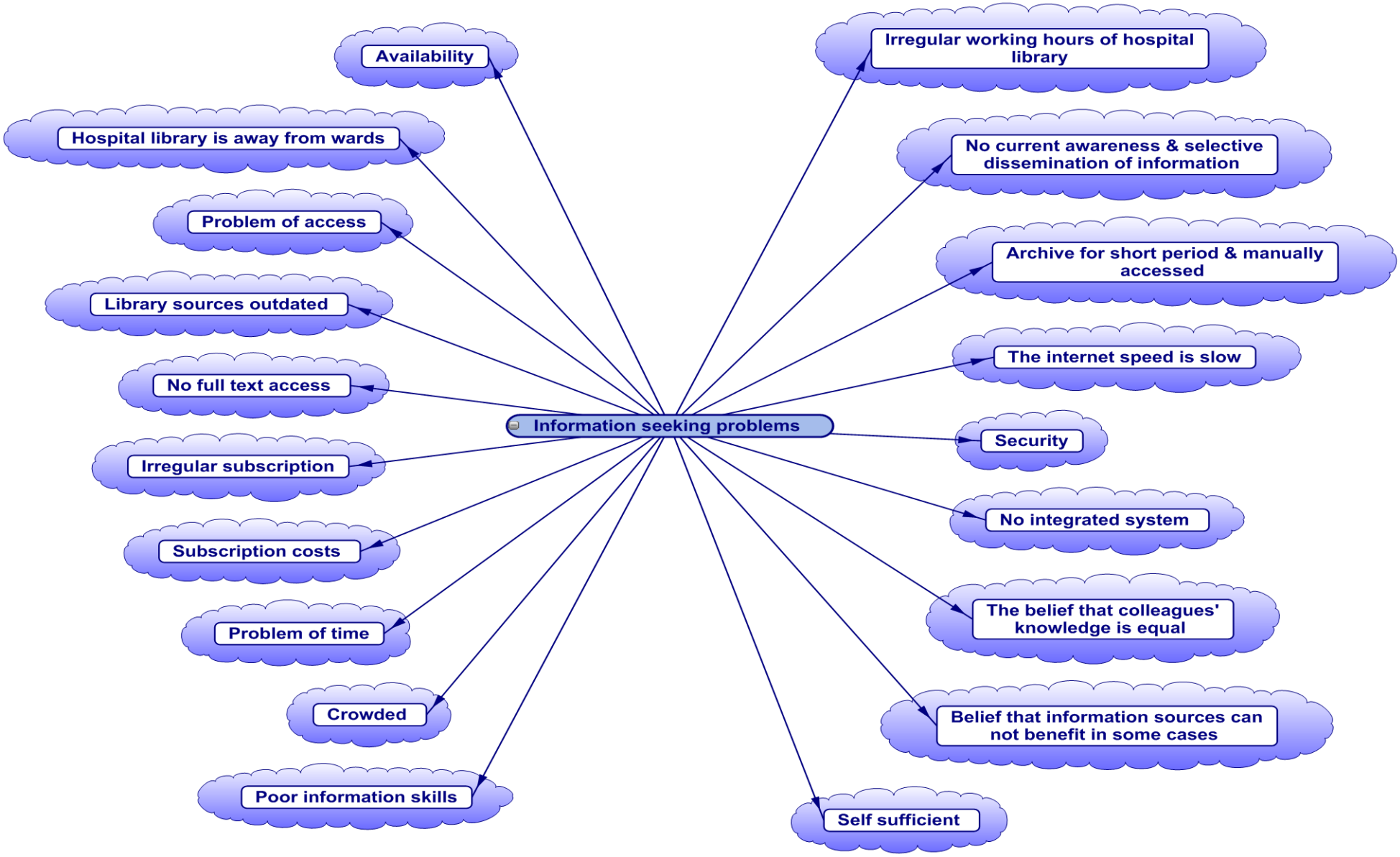
7.3.10 Compatibility with health equipments

"The system should be compatible with the health devices, particularly the laboratory and radiation equipments where you can use the system to search medical knowledge resources and search the patient information, such as laboratory results and his medical images." (Interview fifteen)

7.4. Information seeking problems

This theme covers the obstacles that doctors encounter when searching for information. The problems that were identified included: availability, problem of access, poor information skills, full text access, security, there is no integrated system, subscription is costly, irregular subscription, problem of time, crowded, books and journals are out of date, no current awareness, irregular working hours of the hospital library, hospital library is away from wards, the belief that colleagues knowledge is equal, doctors feel overwhelmed by the vast amount of information that needs mediator, archive for short period in hospital, the internet speed is slow, belief that information sources cannot benefit in some cases and there are no electronic medical records in hospitals as shown in figure (7.32).

Figure (7.32) Information seeking problems



7.4.1 Availability

Doctors indicated that some types of information resources were not available and there are no electronic medical records in hospitals. Moreover the available sources were not enough.

> *"The consultant is not available whenever you want him… and new journals and books are not available in the hospital."* (Interview one)
>
> *"Proceedings and research papers are not available."* (Interview twelve)
>
> *"There is no internet connection from the hospital."* (Interview twenty-seven)

7.4.2 Hospital library is away from wards

> *"The hospital library is away from the ward."* (Interview one)
>
> *"I am usually busy with the patients. I cannot leave them to go and find information in the library and the internet. They are away from the ward."* (Interview ten)
>
> *"I searched the internet later on, although I believe that I could have found better information in the text book but I do not have enough books and at the time that I needed information the hospital library was too far away."* (Interview twenty-one)

7.4.3 Problem of access

Although some information sources were available in the hospital, doctors faced problems accessing such information sources as indicated by the following quotations:

> *"It is available in the hospital but not accessible after one o'clock in the afternoon."* (Interview three)

"Sometimes they are busy lecturing or doing their work, therefore you cannot access them at the time of need." (Interview six)

"You need to go to the administration to get access to the internet." (Interview ten)

7.4.4 Libraries' sources are out of date

Although libraries, whether in hospitals or in the medical faculty, have some information sources, data show that the sources are out of data which make them useless for doctors. However, some doctors indicated that some of their colleagues donate their printed copy of the journals which they have subscription with, to the hospital library as articulated by the following quotations:

"Unfortunately, journals in the libraries even in the medical university library are out of date." (Interview five)

"There are some books in the hospital library and journals but they are out of date." (Interview twelve)

"The books in the hospital library are old." (Interview twenty-seven)

"Some doctors download some new sources and but them in the hospital library." (Interview twenty-eight)

"Some doctors have subscriptions with some journals and they bring their copy to the hospital library." (Interview thirty-two)

7.4.5 Full text access

"I cannot access the full text I need a good internet link and subscription to the site." (Interview three)

"One of the problems is the full text access sometimes I find good information in the abstract but I cannot get access to the full text." (Interview twenty-five)

"There is internet in the hospital but we do not have a subscription with the international journals to get access to the full text the internet without a subscription is not beneficial." (Interview thirty-three)

7.4.6 Irregular subscription

"There is a subscription to some journals but it is not regular. There are subscriptions for four years, then no subscription for five years, it is problem." (Interview eleven)

"The Libyan Board of Medical Specialities and the Medical University have subscriptions with some journals but there are always gaps between the issues. It is irregular subscriptions" (Interview fifteen)

"There were subscriptions to some international journals which stopped for a time then started again but now there are no subscriptions." (Interview twenty-seven)

7.4.7 Subscription costs

"I log into the internet through the internet café, however it is really costly." (Interview two)

"We try to subscribe to two journals related to infectious diseases but it is really expensive as one costs about three thousand pounds and the other costs two thousand and five hundred euro, I think the hospital should make them available." (Interview twenty-nine)

"It is not easy to subscribe to a journal. It is expensive and you need to pay for the internet to get access. It is really expensive." (Interview twelve)

7.4.8 Problem of time

> *"I cannot go out to the library or to search the internet when ever information is needed. I do not have time to do so."* (Interview three)
>
> *"If someone can search information for me it is excellent as I do not have enough time to do it whenever I need information."* (Interview seven)
>
> *"I am usually busy with the patients. I cannot leave them to go and find information."* (Interview ten)

7.4.9 Crowded

Being crowded was seen by doctors as one of the problems that have an influence on their use of libraries and the internet whether in hospital libraries, the medical faculty library or in the Libyan board for Medical Specialities. Data indicated that doctors prefer not to use such libraries where there is not enough space or they are more likely to be disrupted by others who are waiting as demonstrated in the following quotations:

> *"The medical faculty library is serving a lot of students and different departments so it is crowded; I think we should be connected to the medical faculty library through a network from the hospital."* (Interview fifteen)
>
> *If there is someone who can help me to do the search in fifteen minutes instead of wasting one hour in a simple search such a service would reduce the crowd in the library."* (Interview thirty-two)
>
> *"The internet place in the hospital library is crowded sometimes you cannot find a place which means a queue, and if you find place you might be interrupted by the people on the waiting list."* (Interview seven)

7.4.10 Poor information seeking skills

Doctors feel overwhelmed by the vast amount of information that they can access from electronic resources and the internet due to lack of appropriate information skills. They clearly expressed the need for a mediator to manage this problem:

> *"I think if I have proper information skills I will do more efficient and fast searches."* (Interview nine)
>
> *"Searching for information takes four to five hours… I do not have appropriate skills to search electronic sources."* (Interview eighteen)
>
> *"My experience with the internet is not one hundred percent I cannot find a lot on the internet."* (Interview twenty-one)

Some doctors indicated a need for a training programme to develop their information seeking skills in order to be able to conduct more efficient searches using different electronic search techniques:

> *"There should be intensive training for doctors to know how to use the internet efficiently."* (Interview twenty-one)
>
> *"I think doctors should attend a computer training program to develop their skills."* (Interview eighteen)
>
> *"I wish there were a training program focusing on how to use computers and how to perform efficient searches to retrieve appropriate information."* (Interview thirty-two)

7.4.11 Irregular working hours of hospital library

> *"The hospital library does not open regularly sometimes I go only to find it closed."* (Interview one)
>
> *"The library should open twenty-four hours. I might need something in the night."* (Interview six)
>
> *"The hospital library opens from eight o'clock in the morning until one o'clock in the afternoon and sometimes it is closed during this time."* (Interview seven)

"The working hours of the hospital library are not appropriate." (Interview nine)

7.4.12 No current awareness and selective dissemination of information

Data indicate that doctors would like to have someone who can help them to be informed with the recent information in their fields. They believe that such a service can keep them up to date with the recent developments in the field in addition to saving their time.

"If you come to the library they give you information but if you are away they do not send you any information." (Interview one)

"It is supposed that everyone receives a note about the new information in his field from the library, but unfortunately that does not happen." (Interview seven)

"There should be someone who can inform me about the new information from different sources such as the websites and the electronic databases. I can provide him with the sites and the topic of interest and he should keep me updated with the new publications… there might be an article in gynaecology in highly respected journals and there should be someone who can summarise the article and provide us with a conclusion." (Interview thirty-four)

7.4.13 Archive for short period and manually accessed

Doctors indicate that they need to obtain information about the previous history of the patients. However the patient documents which are placed in the hospital archives are not preserved electronically to be accessed from the wards. To access such information doctors depend mainly on the discharge paper that the patient should bring with him or the patient remembers the discharge date. In addition, some hospital archives are preserved for a short period and doctors cannot access such information if the patient has had a previous admission in other hospitals

"The archive in the hospital is limited to a short time. I cannot get access to the old files." (Interview five)

"The problem of the archive in the hospital is the short period as the patient file is preserved for five years only… and you cannot access the patient file if he has had a previous admission into other hospitals." (Interview twenty-five)

"The patient brings the discharge paper with him to access his file from the archive. Without the discharge paper it is very difficult, if not impossible, to access the old file." (Interview twenty-eight)

7.4.14 The internet speed is slow

"There is an internet link in the hospital but it usually crashes and is slow we do not rely on it." (Interview two)

"The problem of the internet is the weak link; you may find a strong signal and/or poor signal and sometimes no signal at all." (Interview three)

"If I have time I go to the internet, but unfortunately the internet speed is slow." (Interview seven)

7.4.15 Security

"In general one of the reasons that push doctors towards not using the technology is the security. They afraid of information theft." (Interview fifteen)

"The patient file, whether in paper or electronic form, should be kept in a way that does not allow anyone to access it except the authorised people." (Interview twenty three)

"There should be a central network where we can find detailed information about the patients and their previous health problems…this system should be with specific and different authorisations for different people for instance doctors, managers and other staff." (Interview twenty-five)

7.4.16 There is no integrated system

"There are different software which give information about, for instance, drugs and their side effect, dose and how to use them with other drugs. In addition there are different software that manage the patient data, but unfortunately there is no integrated system that can let us access such information from one system." (Interview fifteen)

"There is no integrated system in the hospital there should be electronic database in the hospital linked with computers from the wards, Such a database helps in two ways; one is that I can log through it into medical knowledge in books and journals and the other way is that we can log through it to all the patient data. In this case I do not need someone to bring me the patient file from the archive and someone to bring me the results from the laboratory and I do not need to search medical knowledge from other places or systems." (Interview thirty)

"There was an attempt to build a network to connect the ward with the archive and the laboratory, but unfortunately there is no integrated system that can make it possible." (Interview thirty-three)

7.4.17 The belief that colleagues' knowledge is equal

"I consulted my colleagues before about a case but the level of knowledge was the same. They could not provide me with good information that solved the problem." (Interview one)

"Colleagues for simple discussions and it is rare that there opinion is different to yours." (Interview six)

"In the case of rare or new diseases the colleagues cannot benefit you. They are going to say the same thing you know about the disease." (Interview twenty-five)

7.4.18 Belief that information sources cannot provide help with some cases

"The patient cannot move or breathe we did try with scanning and we found that the spinal cord was not injured. You will never find any information source that says the patient cannot move, in such cases the information source does not help." (Interview five)

"The medical information sources in general do not help in such a case we need someone expert either a radiologist or endoscopist who can read and give me a clear cut decision." (Interview eighteen)

"The medical book can give you information to treat a disease in a specific way in particular conditions, but there are different conditions in our area so it does not help with such cases." (Interview twenty-three)

"I can search information sources but information from some types of information sources might not be applicable to a patient case for different reasons. One of them is the patient situation." (Interview thirty-two)

7.4.19 self sufficient

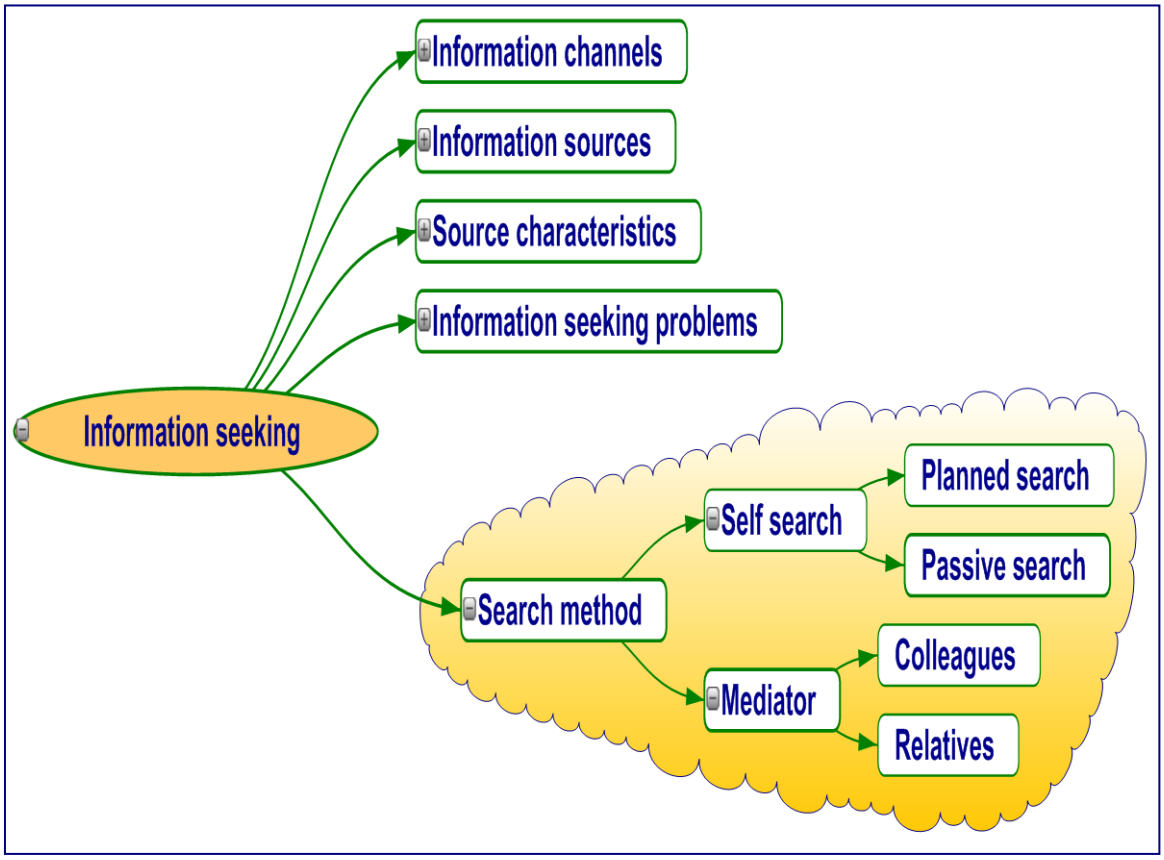
"The daily work depends on the accumulative experience of doctors... majority of the work does not need access to information... with routine cases just have a look at the case I can make the decision." (Interview eleven)

"It is difficult to say that we do not want information but it is your experience that has accumulated over the years that makes you almost happy without a need for the other sources." (Interview three)

7.5 Search methods

This theme indicates the methods that doctors use to conduct information searching. The search methods included: self search and the search through mediators as shown in figure (7.33)

Figure (7.33) Search methods



7.5.1 Self search

7.5.1.1 Planned search

> *"I wanted to know why the iron based treatment did not influence the patient anaemia."* (Interview eight)
>
> *"I wanted to know more about diabetic acidosis and the vomiting."* (Interview twenty)
>
> *"I wanted to know why the patient goes under hypoglycaemia and hyponatremia though she was in the process of dialysis that was the reason why I used books and searched the internet."* (Interview twenty-six)

7.5.1.2 Passive search

"While I was doing the search I found some other information that I needed for another issue." (Interview one)

"I prefer to do the search myself as I may find information other than what I planned to search so I can get more benefit." (Interview four)

"Today while I was searching for information about the impact of pregnancy and the blood clot in the lungs, I found new research about the treatment of ovarian cancer which we want." (Interview thirty-four)

7.5.2 Mediator

7.5.2.1 Colleagues

"My colleagues helped me. They searched the internet and provided me with some information." (Interview two)

"Indeed my colleague did the search for me and brought me some information about Bahjat disease as the patient has oral ulcers and genital ulcers." (Interview twenty-eight)

7.5.2.2 Relatives

"I ask one of my children to get information for me and print it out for me." (Interview three)

7.6 Summary

In summary it appears that qualitative data have reinforced some quantitative data and expanded some others. Furthermore the qualitative data provided information that may explain some quantitative data regarding doctors' information seeking behaviour. The qualitative data reinforced and expanded the information channels used by Libyan doctors to access information. These included: morning meeting report; workshops; medical symposium and conference activities; seminars and group discussion and information sources from drug companies. Also qualitative data expanded libraries to include the library of Libyan Board of Medical Specialities as one of the channels to access information. In addition information sources expanded further, for example human sources expanded to include visiting doctors and contacts with external experts; paper sources included medical atlas and lectures and drug companies were indicated as another information sources for Libyan doctors. With regard to source characteristics qualitative data presented further details about them. For example mobility; reliability; credibility and authenticity; comprehensive and compatibility with health equipment were found to influence the usage of different information sources. Finally the qualitative data revealed more information seeking problems, such as self sufficiency; lack of information services for example current awareness.

Chapter eight Discussion

8.0 introduction

This chapter presents a discussion of the results obtained from 256 questionnaires and thirty four interviews with Libyan doctors working in Libyan hospitals. The main aim of the study was to investigate the information needs and the information seeking behaviour of Libyan doctors who work in an urban area and those who work in a rural area in Libyan hospitals. The aim and the specific objectives of the study are detailed in chapter one.

8.1 The chapter structure

The discussion in this chapter is in light of the aim and objectives of the study. Hence to let the discussion logically flow this chapter is divided into two main sections, the first focused on doctors' information needs and the second focused on doctors' information seeking behaviour. The first section starts with a discussion of doctors' information needs and the influence of age on information needs, then a discussion of the context as a higher level in which information needs emerged, followed by a discussion of the motivations that gave rise for information needs in that context. After that the reasons or the purposes for which information needs were used discussed. To continue the logical flow the second section starts with a discussion of the channels used to access information, as they are the first step towards fulfilling information needs after recognising and identifying the information needs. Then the sources used to fulfil doctors' information needs are discussed, followed by a discussion of the source characteristics that were believed to influence the different sources usage. After that barriers that hampered doctors in meeting their information needs are discussed. In general the discussion in this chapter includes an explanation of the identified data; however in certain cases or situations although there were no empirical data, explanations for the data are given.

8.2 Doctors' information needs

Data revealed different types of information needed by Libyan doctors. These types were clustered under three main themes: patient information, general health information and managerial information. The first theme included all types of information that is associated with a specific patient. This particular

information included: personal information, medical history, clinical images, clinical results and family information. The second theme included disease information, medical imaging and medical laboratory information, treatment information, drug abuse, the mechanism or interaction of recreational drugs and the chemical substances in food. The third theme included: medical guidelines, information about new medical developments, referral information and associate statistics.

Although it was difficult to compare doctors' information needs that were emphasized in this study with the results of other studies due to different definitions of terms by other authors, they seemed consistent with previous studies that identified such information needs. For example diagnostic information was identified by Bowden, Kromer and Tobia, (1994); Green, Ciampi, and Ellis, (2000) and Seol et al., (2004), treatment information was reported by Dee and Blazek, (1993) and Lappa, (2005), drug information was recognized by Verhoeven, Boerma and Jong, (1995) and Forrest and Robbt, (2000), Green, Ciampi, and Ellis, (2000) and Change, (2004) identified therapy information. Patient treatment and particularly pharmaceutical information was identified by Strasser, (1978); Bowden et al., (1994); Bryant, (2004) as well as Lappa, (2005), disease condition was identified by Meats et al., (2007), population and health statistics were recognised by Lundeen et al., (1994) and Thompson, (1997), Seol et al (2004) identified medical knowledge in general,

Data in this study showed that information about diagnosis in general was the most important information for urban doctors. Diagnosis means identifying a disease using different investigation methods carefully. Investigation methods include listening with the ear or stethoscope, inspection with the naked eye, palpation or feeling by touch, percussion or striking part of the body in order to use the resulted sound in diagnosis, temperature examination, in addition to clinical imaging and laboratory analysis. The importance of diagnostic information was indicated between 'very high' to' high' by 202 (93.95%) out of 215 of the urban doctors. Followed by information about treatment in general with 200 (93.02%) of doctors, then information about patient data which numbered 193

(89.76%) of the respondents, after that comes information about drugs and laboratory tests and radiations with 187 (86.97%) for each of them.

On the other hand, rural doctors indicated that information about drugs was the most important information. It is selected by 40 (97.56%) out of 41 of rural doctors as 'very high' to 'highly important'. This was followed by information about diagnosis and treatment with 39 (95.12%) of rural doctors for each of them, then information about laboratory tests and radiation for 38 (92.68%) of the respondents. This result might be due to lack of working experience as from personal experience the doctors in rural areas did seem younger than the doctors in urban areas. However, there were no empirical data to support this argument.

This study found more similarities than differences between rural and urban doctors regarding their information needs. Data in this study demonstrated that there was no evidence of difference between urban and rural doctors regarding their needs for patient data, information about diagnosis in general, information about laboratory tests and radiology, treatment, drug information, information about physical signs and symptoms, psychological aspects of diseases, medical knowledge, referral information and information about new medical equipment. This result is consistent with previous literature that found that similarities between urban and rural doctors outweighed the differences. Examples of previous literature included Dee and Blazek, (1993); Lundeen et al., (1994); Shelstad and Clevenger, (1996); Bryant, (2004); Gorman et al., (2004) and Gonzalez- Gonzalez et al., (2007)

However the outcomes of this study showed some differences between urban and rural doctors concerning the importance of different kinds of information needs. One of the differences was information about disease conditions. The results proved that there was a statistical difference with p-value (χ^2=10.839 DF=1 and P= .001). It was suggested that a larger proportion of urban doctors needed information about disease conditions than did rural doctors. Information about disease conditions was indicated as highly needed by

80% of urban doctors; on the other hand it was indicated as highly needed by only 56% of rural doctors. Although there were no empirical data that could explain why there was such a difference, it is suggested that the difference might be attributed to the wider variety of diseases in urban areas than in rural areas. In addition, a larger number of people from other countries were diseases are found live in urban areas rather in rural areas in Libya. This means that urban doctors may have met a larger number of diseases which their counterparts in the rural area may not have encountered.

Another difference was associated with the population statistics. Data demonstrated that there was evidence that urban doctors needed population statistics more than rural doctors did, with p-value (χ^2= 4.229 DF=1 and P= .040). Data suggested that might be ascribed to the fact that many urban doctors were involved in medical education at medical universities. The data reported that there was a statistical difference between doctors who were involved in teaching and those who were not involved in such activities, with p-value (χ^2= 5.325 DF=1 and P= .024).The study pointed out that doctors involved in teaching needed more information about population statistics than did doctors who were not involved in a teaching job. The proportion of those involved and who indicated population statistics as highly important was 27.86%, whereas the proportion of doctors not involved indicated such information as important was 14.87%. As part of their academic job doctors were likely to need statistics and figures to support ideas, to make scientific comparisons and to make generalised statements or to talk about things at a higher level. For example in general (x) number of people have this or why (x) number of people have this, tends to be a consequence of being involved in teaching. Hence it may explain why more urban doctors needed this information than did their counterparts in the rural area who were not involved in teaching.

8.1.1 Information needs and age

With regard to doctors' information needs and age, although data showed a similarity between older and younger doctors, it also highlighted some statistical differences between doctors based on their age (where doctors classified into two groups; thirty nine years old or less and forty years or older). First there was statistical evidence that there was a difference between older and younger doctors based on their age concerning their needs to information about physical signs and symptoms with p-value (χ^2=6.030 DF =1 P=.014). Data suggested a larger proportion of older doctors needed information about physical signs and symptoms than did the younger ones.

There was highly significant evidence that there was a difference between the two age groups regarding their need for information about psychological aspects of diseases, with p-value (χ^2=13.180 DF =1 P=.000). A larger proportion of older doctors needed information about psychological aspects of diseases than younger doctors.

It also evident that there was age difference between with respect to their need for the medical knowledge, with p-value (χ^2=4.786 DF =1 P=.029). Data showed more older doctors (77.61%) indicated medical knowledge as highly needed than younger doctors (62.96%). In addition, there was a highly significant difference between the two groups concerning their need for population statistics, with p-value (χ^2=13.608 DF =1 P=.000). According to data, a larger number of older doctors highly needed population statistics than younger doctors. This might be a consequence of older doctors being more involved in teaching and research.

Finally, there was evidence of a difference regarding referral information between older and younger doctors, with p-value (χ^2=4.328 DF =1 P=.037). Data demonstrated that a larger proportion of older doctors indicated that referral information is highly needed than younger doctors. Although, there are no empirical data that can explain this result, it could be suggested that, because younger doctors work in a team under supervision of a consultant, when there is

a complicated issue they can ask or get an explanation from the consultant. On the other hand, consultants did not work under supervision so they needed to know this information in case they encountered a medical problem that needed consultation.

8.1.2 Information needs context

The main contexts within which doctors' needed information were clinical practice and education. Within these contexts doctors were involved in different tasks, such as patient care, decision making, teaching and studying. In the context of patient care doctors sometimes encountered patients where they needed information. It was apparent that information in the context of patient care was crucial for doctors and this is consistent with earlier studies such as Strasser (1978) and Dee and Blazek (1993) and the more recent studies (for example Bryant, 2004; Lappa, 2005 and Gonzalez- Gonzalez et al. 2007). Examples of the previous studies that identified educational (higher level which includes both teaching and studying) context for information needs include Bowden et al., (1994) and Shelstad and Clevenger, (1996).

However, the most common kind of information that a large proportion of urban doctors used to provide patient care included general information about diagnosis, patient data, treatment, laboratory tests and medical images, disease psychological aspects and disease conditions.

Similarly rural doctors demonstrated that patient care was by far the most significant context. The most heavily used kind of information in the context of patient care was general information about laboratory tests and medical imaging, psychological aspects of disease, patient data and treatment information.

With regard to involvement in educational (teaching and/or studying) professions, the statistical analysis using chi square and Fisher's exact test showed no evidence that participation in research and further studies might have had an influence on doctors' information needs, as p-value for research with all kinds of information ranged between 0.112 to 0.869 and ranged between .085

and 0.972 for further studies and all kinds of information needs. That means the p-value was > α 0.05 and statistically not significant, which means the differences might be attributed to chance. Likewise participation in management did not appear to have an influence on doctors' information needs as Fishers' exact test shows that p-value ranged between 0.117 and 1.000 which was not significant.

However, that was not the case with doctors who were involved in teaching. The outcomes here indicated that there was statistical evidence that there was a difference between doctors who were involved in teaching and those who were not participating in such activities. The difference was evident concerning the need for information about psychological aspects of a disease with p-value (χ^2= 6.020 DF=1 and P= 0.014). Data illustrated that a larger proportion (75.40%) of the doctors who were engaged in teaching needed this type of information than did doctors who were not involved in teaching (57.94%). Also the difference was obvious in reference to the need for information about medical knowledge in general with p-value (χ^2= 5.106 DF=1 and P= 0.024). The study proved that a larger proportion (78.68%) of those that had teaching responsibility needed medical knowledge than did the doctors who did not have teaching responsibilities (63.07%). Finally the difference was apparent regarding the need for population statistics, with p-value (χ^2= 5.325 DF=1 and P= 0.024). The results reported that doctors involved in the teaching profession needed more information about population statistics than doctors who were not doing teaching. The percentage of those involved in the teaching was 27.86% and the proportion of doctors who were not involved was 14.87%.

8.1.3 Information needs motivation

This study demonstrated that in the course of achieving their tasks, doctors encountered different patients with different health problems. Some of the health problems were clear and easy to manage, however other health problems were less clear and led to concern. The concern or anxiety was attributed to either having uncertainty or ambiguity. When doctors were lacking information to help decide or evaluate the impact of their intervention on the health problem, though they might have thought that they were aware of what to do and what results they

were seeking but were not sure of the results of their intervention, in such a state doctors were in a state of uncertainty. On the other hand, when doctors lacked clearness and direction about the health problem, they were in a state of ambiguity. For example, doctors sometimes were not satisfied with their understanding of the problem and what should be involved to deal with the health problem. In addition they were not aware of the data they needed and in such cases a ambiguity issue was the result. Doctors needed information to confirm their opinion when uncertain; however they also needed information to resolve confusion and ambiguity.

This result echoes the results from previous studies (Wilson, 1999b and Hepworth, 2004). While Wilson (1999b) mentioned the psychological factor within five kinds of “intervening variables”, Hepworth (2004) suggested “psychological data” as a broad heading of data related to the psychological state.

In conclusion it was apparent that doctors’ information needs emerged in contexts such as education and clinical practice, where particular tasks needed to be performed. However doctors, when they were carrying out their tasks, encountered different types of difficulties that created ambiguity and uncertainty. It was indicated that a cognitive state might give rise to specific information need which in turn may or may not lead to seeking information. For instance Wilson (1997) indicated that people tend to be uncomfortable when they experience conflicting knowledge or when they are uncertain about a situation or topic, consequently, they might seek further information to eliminate or diminish the conflict and the uncertainty. In order to resolve the cognitive state doctors needed diverse types of information, such as patient based information, general health information and managerial information.

8.1.4 Reason or purpose for information needs

Data suggested that doctors needed and used information for different purposes or reasons. Mainly six purposes or reasons were identified. These included: updating and refreshing, continuing medical education, to answer colleagues' questions, to answer patient and their family's questions, to write a research paper and to know the meaning of abbreviations.

These reasons or purposes are similar to results of previous studies. Being up to date was recognised by previous studies, such as Lundeen, et al. (1994); Kromer and Tobia, (1994) and Bryant, (2004). Answering and teaching colleagues (for example, giving them some details about the health issue) was identified by Lappa (2005). Writing a research paper was acknowledged by Bowden et al. (1994). Continuing medical education was documented by Shelstad and Clevenger (1996). Answering and teaching patients and their families (for example educating the patients and/or their families about the health problem and general information about the disease and how it could be treated and the side effects etc) was reported by Lappa (2005) and Nail-Chiwetalu and Ratner (2007)

However in this study it was demonstrated that apart from being up to date not all kinds of information were equally used by urban doctors for all purposes. Data suggested that patient data were more heavily used to answer patient and their families' questions than other kinds of information. For education purposes urban doctors used diagnostic information and general medical knowledge more than they did with other types of information. In order to answer their colleagues' questions urban doctors were more likely to need general information about diagnosis, laboratory tests and medical imaging and patient data. Finally they hardly used information about the psychological aspects of disease or population statistics to answer colleagues' questions.

Concerning rural doctors, for the purpose of being up to date they used drug information, medical knowledge and general information about treatment

more than the other types of information. General medical knowledge and diagnostic information were more likely to be used for answering their colleagues' questions than other kinds of information, and patient data was used more to answer patient or their families questions.

In comparison between rural and urban doctors data revealed statistical evidence that there were differences between urban and rural doctors concerning their usage of treatment information to write research papers, whereas p-value (χ^2=4.558 DF =1 P=.033), data showed that a larger proportion of urban doctors (36.74%) used general information about treatment for the purpose of writing research papers than did their counterparts' rural doctors (19.51%). This result may be due to the fact that the number of doctors involved in research work in urban areas was higher (46 out of 215) compared to the number of doctors involved in research work in rural areas (1 out of 41).

There was also a statistical difference regarding the utilization of medical knowledge particularly from information sources rather than depending on their experience to answer colleague questions with p-value (χ^2=3.867 DF =1 P=.049). According to the results rural doctors (26.82%) used medical knowledge in printed and electronic forms to answer colleagues' questions more than did urban doctors (14.41%). This could be due to lack of experience.

In addition, from the results it appeared that urban doctors were not exactly the same as rural doctors regarding their usage of referral information to care for patients, with p-value (χ^2=7.890 DF =1 P=0.005). A larger proportion of rural doctors (56.09%) used referral information to provide health care to the patients than did urban doctors (33.02%). Another difference was there in terms of using referral information for educational purposes with p-value (χ^2=3.987 DF =1 P=0.046). The study demonstrated that a larger proportion of the rural doctors (21.95%) used referral information in education than did urban doctors (10.69%).

Finally data suggested that urban and rural doctors were dissimilar in their use of information about new medical equipment for the purpose of being up to

date, with p-value (χ^2=8.393 DF =1 P=.004). The outcomes illustrated that more urban doctors (53.95%) used this information than did rural doctors (29.26%). This could be because more new equipment went to urban hospitals than to rural hospitals and, as a consequence, doctors needed this information to be able to use this equipment. Furthermore it could be a consequence of being involved in teaching where doctors need to know about new equipment for education purposes.

8.3 Libyan doctors' information seeking behaviour

Doctors, in order to fulfil their information needs, used different information sources, which were accessed through different channels. The following discusses doctors' information seeking behaviour.

8.3.1 Channels

This study identified different channels for accessing information. These included: a personal library, the Libyan Board of Medical Specialities Library, the hospital library, the medical faculty library, personal contacts, the internet (meaning information accessed via the internet), morning meeting reports, workshops, medical symposium and conference activities, drug companies' information, via a personal computer or workplace computer and telephone.

The channel that had a crucial role and was heavily used in facilitating urban and rural doctors' access to information was their personal library, followed by the internet sources. In comparison data indicated that overall the hospital and medical faculty libraries were not involved to a greater extent to access information, although data showed that a large proportion (84.19%) of urban doctors and (56.09%) rural doctors indicated that the hospital library was easy to access. This result is consistent with Dee and Blazek, (1993); Bryant, (2004) and Doney et al., (2005) who indicated that the medical library was not utilized heavily by rural doctors, family doctors or general practitioners. What is more, Bryant's study also suggested that the personal library was the preferred information source for family doctors. Nevertheless, this result contradicts other studies' results such as Andrews et al. (2005) who concluded that medical libraries were used heavily by the respondents in their study; this may be because 55% of the respondents in their study reported that they can access the library via the internet. However they found that 21% of the respondents rarely used the clinical library and 7% articulated that they never used the clinical library. The study did not provide reasons for why some participants rarely or never used the medical library.

Comparing urban and rural doctors, overall the data revealed that there was a statistical difference between urban and rural doctors regarding their usage of the hospital library to acquire work related information, p-value= (χ^2=9.665 DF =2 P=.008). Data suggested that urban doctors used hospital libraries more than rural doctors did. It was apparent that while a larger proportion (29.9%) of urban doctors reported using the hospital library as a first or second channel to access information, a larger proportion (80%) of rural doctors indicated that they used the hospital library as a fourth or fifth channel when searching for professional information.

In contrast there was no statistical difference between urban and rural doctors regarding their usage of medical faculty libraries. However the study reported that urban and rural doctors did not use such libraries heavily, though a large proportion of the urban (68.84%) and (68.29%) of the rural indicated that the medical faculty library was easily accessed. This indicated that ease of access did not translate into a greater usage of these libraries (the hospital and medical faculty library). This implies that there might be other variables that may influence the usage of such libraries.

Data in this study indicated that one of the problems that influenced the usage of hospital and medical faculty libraries was the outdated library sources. Also doctors thought that medical libraries had irregular journal subscriptions. Another problem was the lack of current awareness and selective dissemination of information. Doctors claimed that such services could stimulate their use of the libraries. Doctors also reported that these libraries were crowded and they could barely find a place to read, particularly if they wanted to use the internet. Doctors believed that the hospital libraries could not accommodate a large number of users. The final barrier that they identified was inappropriate working hours. They claimed that hospital libraries were opening at times when doctors were supposed to be managing patients or doing their educational job. They looked forward to more flexible hours that would enable them to access whenever they need information. Similarly Forrest and Robbt (2000, p 133) reported that doctors in training polled in their study believed that “the best time to use the library is out

of hours". In addition Bryant (2004) observed that "opening hours", "distance" and "parking" were the factors that restricted the family doctors from using the local medical library.

Compared to other channels personal contacts were the easiest channel to use, as it was indicated 'very easy' to 'easy' by 90.23% of urban doctors and 85.37% of rural doctors. Data suggested that this may be attributed to the fact that human sources were willing to help give information at the time of need and they gave relevant and authentic information quicker than if doctors searched the libraries, which involved going to the library, locating the information source and reading it until they found the part that would be relevant to their information need.

8.3.2 Information sources

8.3.2.1 Paper sources

Although doctors use different paper sources, such as books, journals, research and conference papers and pamphlets, doctors were more reliant on books to access information than other information sources. They believed that books are authoritative, credible, comprehensive, portable and easy to use which made them a reliable source to obtain information that can be used at the time of patient management. The study demonstrated that books were extensively used for patient care, confirming opinions, updating and education purposes more than for any other purpose. However, doctors thought that the main issue with regard to recent editions of the medical books was that they take a long time to be available and accessible through the library and also the purchase cost was high.

Other paper sources, in particular, journals and conference and research papers were identified as one of the information sources that helped doctors meet their information needs. Some doctors, however, thought that both conference papers and research papers in general related to ongoing studies, which meant that they were not authoritative, reliable and accurate for use in daily practice. However they believed that they can be used for the purposes of being up to date and for writing research papers and generally for educational purposes. What is more the data indicated that doctors believed that what was published in the medical journals and research and conference papers usually was published in medical books and textbooks as soon as such information was accredited and became applicable in the medical practices. Doctors' usage of journals and conference and research papers was also affected by availability (being in the country); accessibility (some sources were available in the country and the hospital but were not accessible); irregular subscription with journal and the subscriptions costs.

Professional newsletters were consulted for the purpose of keeping up to date or to help with educational work. The main issue with professional newsletters was authoritativeness, reliability and accuracy. It was reported that such sources might be influenced by commercial advertising. Nevertheless they

could provide information on new developments or give new instructions that may be investigated in more detail in authoritative and reliable resources, such as medical books and journals.

Using books as a first source for information by doctors in this study, agrees with Haug's (1997) conclusion and Dawes and Sampson (2003). They concluded that many studies have concentrated on doctors' preferences for information resources, and reported that books and journals were the first sources of information for doctors. In addition both Bryant (2004) and Boissin (2005) pointed out that paper resources and personal contacts were the main source of information for doctors for patient care. What is more Gonzalez- Gonzalez et al. (2007) also found that the internet was not used as much as the paper sources to seek answers for doctors' clinical questions in the context of patient care. However, some other studies, for example Strasser (1978) and Verhoeven et al. (1995) reported the use of other sources, such as human and electronic sources, as a first information source for doctors.

8.3.2.2 Human sources

Human sources, particularly specialist and consultants, were heavily used in the context of patient care, as data showed a larger proportion (57.21%) of urban and (51.22%) of rural doctors indicated using human sources for the purposes of patient care. Human sources were identified as important by previous research. For example Thompson (1997) concluded that personal contacts were particularly important for primary care doctors for acquiring knowledge in the context of routine patient care. McGettigan et al. (2001) showed that communicating with pharmaceutical representatives and hospital consultants are the most significant sources for information on new drugs. Ramos et al., (2003) showed heavy use of human resources by resident doctors to answer their clinical questions.

What was more; the study pointed out that personal contacts would be consulted first in the case of an emergency. In such situations doctors need fast, accurate and applicable information for the health problem. Doctors valued

colleagues, specialists and consultants who have a long experience and are able to examine the patient's situation. This result is consistent with Dee (1993) who attributed the heavy use of human sources to the immediacy, accuracy and reliability of the information.

In addition human sources sometimes were consulted for the purpose of confirming an opinion, similarly data showed that personal contacts were used a great deal by 66.51% of urban doctors and 65.85% of rural doctors to confirm opinions. This is consistent with Dawes and Sampson, (2003, p 14) and Tan et al., (2006). According to Dawes and Sampson and Tan et al. when doctors encounter a difficult patient case, consultation with colleagues and other experts may confirm their knowledge. The final purpose for which human sources were used heavily was keeping abreast of developments. Data showed that 40.93% of urban and 56.1% of rural doctors used human sources for keeping up to date.

However, although doctors consult their colleagues in such situations they would also go back to the medical books to confirm their information. In addition they might search the internet for up to date information. Nevertheless doctors believed that their colleagues were sometimes not easily reached at the time of need, or they could not benefit as colleagues' information was the equivalent of their own information, particularly with rare and new diseases.

8.3.2.3 Electronic sources

Even though information and communication technology is considered a good source for accessing information, remarkably Libyan doctors made little use of it. Data suggested that one of the main reasons was availability in the hospitals. Although they knew that to some extent electronic databases were available through the Libyan Board of Medical Specialities, they believed that they were not accessible whenever they needed them as they were not accessible in the afternoon and not connected to the hospital via the internet. Nevertheless other studies have also reported that electronic sources were underused by doctors, such as D'Alessandro et al. (1998) who found that only thirty one out of ninety three (approximately 33%) of rural doctors who were

surveyed in their study used the digital health science library. In addition Ann and Fridsma (2006) concluded that databases, such as MEDLINE, UpToDate and Evidence Based Medicine Reviews were unlikely to provide precise and correct answer for the clinical questions of general practitioners. However they suggested that this might be due to the use of inappropriate search strategies, poor selection of resources or time pressure.

Although doctors did not use the new information technology, particularly online databases to a great extent, there was some usage of such technology such as online databases and mainly information accessed via the internet. Some doctors mentioned that in order to access online databases they used the access codes of some of their colleagues and friends who had access through other organisations (although doctors did not give names, these organisations seem to be universities or hospital libraries and medical associations). However the data demonstrated that the internet connection was available through some hospitals but not all the hospitals and the Libyan Board of Medical Specialities, in addition to the internet cafés and personal subscriptions.

One of the reasons that drives Libyan doctors to use the internet was to obtain particular information when they could not find that information in either textbooks or the handbooks, especially to seek information about rare diseases or to find information that helped to manage a health problem. In addition Libyan doctors used the internet to access the most up to date information. This result, generally, is consistent with previous research which concluded that usage of the internet to seek medical information was popular for purposes such as keeping up to date; information about rare diseases and solving health problems (Cullen, 2002, Casebeer et al. 2002, Bennett et al. 2004, Dorsey and Detlefsen, 2005 and Nail-Chiwetalu and Ratner, 2007).

Doctors believed that generally the internet was a quicker channel compared to the other channels that were available for them and it was easy to use. The majority (79.53%) of urban doctors reported it ranged between ‘very easy’ to ‘easy’ to find what they wanted in the general medical websites. However only 29.77% of urban doctors considered it ‘very easy’ to ‘easy’ to

obtain what they needed from online databases. Likewise with CD databases, a larger proportion of them (40.93%) believed that it was ‘to some extent’ rather than ‘very easy or easy’ to get information from CDs.

Similarly, rural doctors considered acquiring information from general medical websites (there are no empirical data that gives examples of such websites) easier than other sources. On the other hand it was more difficult with online databases compared to other resources. In addition the percentage of doctors who thought that it was ‘very easy to easy’ to obtain information from library sources was larger (53.66%) than electronic databases and the internet resources except general medical websites.

However data suggested that there were barriers that influenced the usage of the internet to a greater extent, for example the internet was not accessible from the wards; the number of computers was not adequate for the number of doctors, which resulted in a waiting list and not having enough time to do a search. Also poor bandwidth was one of the obstacles that resulted in underuse of the internet.

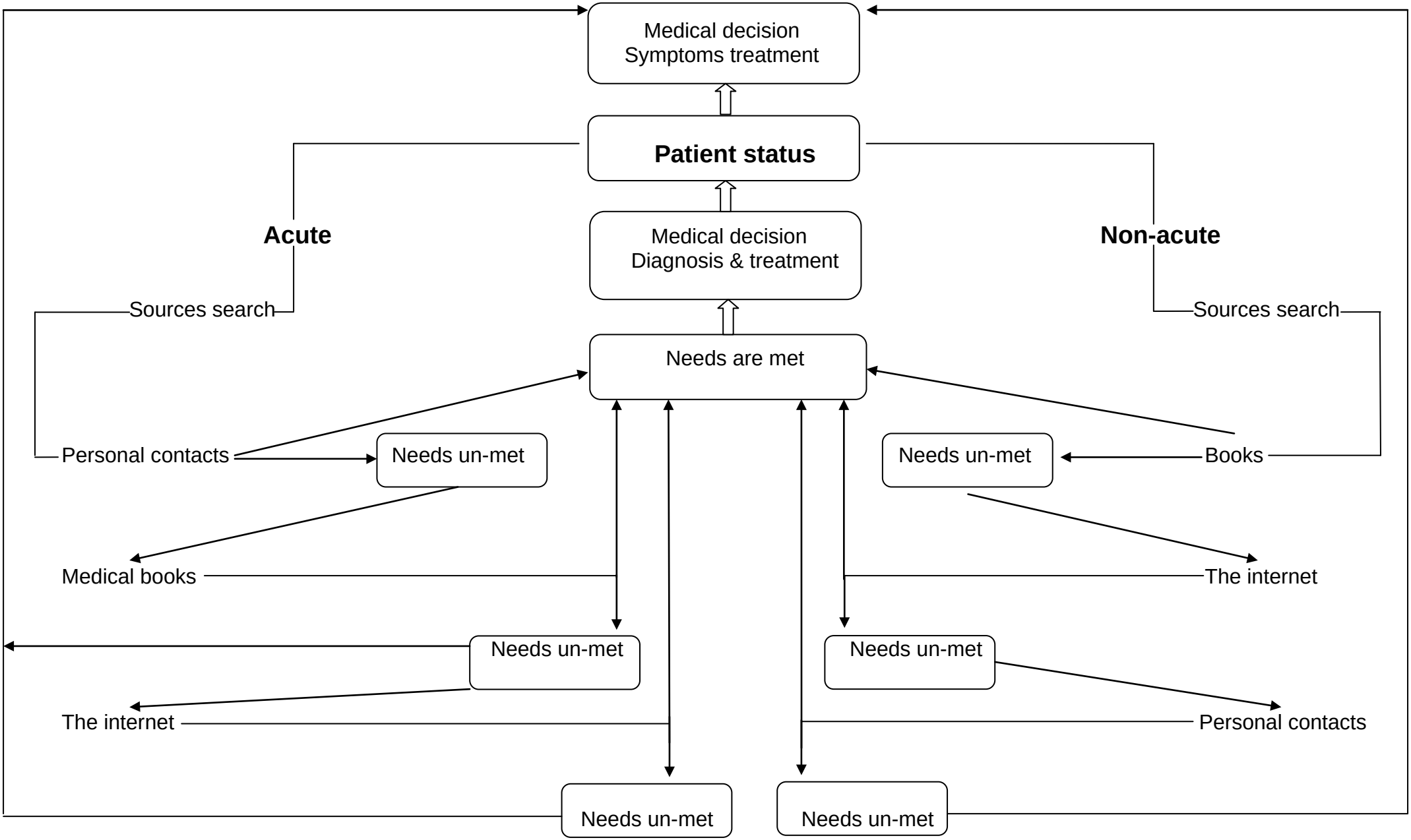
Although the results suggest that there is no difference between rural and urban doctors regarding the ease of obtaining what they need from different information sources, data demonstrated that there was a statistical difference between rural and urban doctors in reference to the ease of obtaining information from the internet resources. Data suggested that a larger proportion of urban doctors believed it was easy to find what they needed from general medical websites (79.5%), expert websites (66%) and medical organization websites (61.4%) than did rural doctors (63.4%), (41.5%) and (39%). This may be because rural doctors were younger and perhaps more familiar with electronic resources.

With regard to both rural and urban doctors, it appears that the majority of them had problems with electronic search skills. The results showed that the majority used the field search technique and used truncation to a lesser extent in the search strategies. However, although a large proportion of them used more than one term to formulate the research questions, few of them applied Boolean

parameters, which indicates that their electronic information skills need to be developed. In fact many doctors declared that it would be helpful to have training focusing on electronic search techniques. This result may explain why some of the doctors felt overwhelmed with the results of the electronic search, as well as their preference for delegating the search to a mediator. This appears to be consistent with D'Alessandro et al., (2004) who showed that help from a clinical librarian in the health care system could result in improving the doctors' information searching skills. Monitoring and providing evidence to support practice could also enhance the health services. Similarly, Urquhart et al. (2007) found that the willingness of doctors to seek information increased when the clinical librarian participated with the clinical group.

In conclusion it appears from the data that urban and rural doctors were similar with reference to their usage of books as a first source to be consulted, and the second source to be consulted was general medical websites followed by consulting human resources. However in the case of an emergency, they first consulted their colleagues, specialists and consultants and then they searched the medical books and the internet sources as shown in figure (8.34). Data demonstrated that there was no evidence that there was a difference between urban and rural doctors regarding the usage of online databases and they were almost the same in that they underused online databases. Finally data revealed that both paper and electronic information sources were more likely to be used where doctors participated in research or education programmes than by doctors in clinical practice.

Figure (8.34) Doctors' information seeking behaviour with acute and non-acute patient status



8.3.3 Source characteristics

With regard to source characteristics data indicated various characteristics or attributes that influenced the usage of different information sources. These included: comprehensive, instant and easy access (it can be accessed whenever and wherever needed); mobile (it can be used from anywhere particularly electronic sources for example having a piece of equipment which can be carried in a pocket to be used to log into information sources); ease of usage; credible and authentic; compatible (electronic information systems need to be compatible with health equipment such as medical imaging and laboratory machines); accurate; reliable (particularly electronic systems should work under any circumstances); up to date and available (source available in the country and the hospital). It was found that some of these attributes could be applied to all types of information sources whether human, paper or electronic based, though some of them were more relevant to a particular type of information source. Compatibility for example was more relevant to electronic sources.

The characteristics that were identified in this study are consistent with some other studies, (for example Strasser, 1978; Dee and Blazek, 1993; Shelstad and Clevenger, 1996; Bryant, 2004; Gorman et al., 2004 and Gonzalez-Gonzalez et al., 2007). These studies emphasized the importance of instant access to relevant and accurate answers to clinical questions in the context of patient care. Wilson (1997) argued that information seeking behaviour might be restrained by the lack of easy access to the information sources. Furthermore, credibility and the accuracy of information on the internet were emphasized by Boissin (2005).

However data indicated that these features have a different impact on the different information sources. For instance, while it was shown that more than half of urban doctors believed availability an important feature that may influence their usage of different information sources, the importance of instant access, credibility and ease of use were dissimilar from one source to another. Instant access was reported as a key characteristic by a large proportion of doctors with regard to journal articles (67.90%), specialist websites (65.58%), professional

organisation websites (62.79%) and personal contacts (50.69%). On the other hand it was less important with regard to professional newsletters (24.18%) and audio visual materials (cassettes and video tapes) (24.65%). Credibility had a greater influence on the use of conference proceedings (70.23%), audio visual materials (68.83%) as well as CD databases with 68.83%, than other kinds of sources. Urban doctors believe that online databases and the internet websites were by far the most sources influenced by the ease of use.

Concerning rural doctors, data revealed that availability was more important than other characteristics. The emphasis on availability of information sources as a key feature that influences the usage of different information sources may indicate that doctors in both urban and rural areas have fewer information sources available to them. As a consequence they might think that there is no point in considering other characteristics as long as the information sources were not available for them. Data also reported that rural doctors believed that credibility influences the usage of books and general medical websites more than other information sources. Usage of the internet websites appears to be, to some extent, influenced by the ease of use in comparison to other electronic sources. Instant access is believed to influence human sources more than the other characteristics. On the other hand audio visual materials were by far the least affected by instant access.

Thus data highlighted some differences between urban and rural doctors concerning the characteristics that influence the usage of different information sources. The results proved a highly significant difference with p-value (χ^2=37.003 DF =1 P=.000) with reference to instant access to journal articles. Data suggested that a larger proportion of urban doctors (67.9%) than rural doctors (17.07%) considered instant access influenced their use of journals. It is possible that this result is because rural doctors had less access to journals (which made them not concerned about instant access as it was not available) in comparison to their counterparts in urban areas who had better access to journals. However it was influenced by instant access, as data showed that one

of the problems of journals was that they were out of data and take a long time to be available in libraries.

Also there was a statistical difference in relation to the credibility of journal articles, with p-value (χ^2=4.619 DF =1 P=.032) and credibility of conference proceedings with p-value (χ^2=24.981 DF =1 P=.000). Data demonstrated that rural doctors (36.6%) were less influenced by credibility when using journal articles than were urban doctors (54.9%) and a larger proportion of urban doctors (70.2%) than rural doctors (29.3%) thought that credibility may influence the use of conference proceedings. The difference between urban and rural doctors regarding the influence of credibility in using journals and conference proceedings is likely to be because doctors in rural areas have less choice and access to this source which made them less concerned about credibility as they were not available. In addition more rural doctors (70%) use journals to keep up to date than any other purposes.

A significant level was also apparent with proceedings ease of usage, with p-value (χ^2=14.683 DF =1 P=.000). Results identified that a larger proportion of rural doctors (39.0%) believed it was an influencing factor compared to 14.0% of urban doctors.

Also the difference was statistically significant with regard to electronic resources. The p-value indicated a statistical difference between urban and rural doctors regarding instant access to audio visual materials (χ^2=4.414 DF =1 P=.036), a larger proportion (24.7%) of urban doctors reported that audio visual materials were influenced by instant access than did rural doctors (9.8%). In addition, a difference was apparent regarding the impact of credibility on audio visual materials usage as well with p-value (χ^2=17.834 DF =1 P=.000). Data pointed out that while over two thirds of urban doctors (68.8%) assumed credibility influences utilization of audio visual materials, just 34.1% of rural doctors said that credibility influences audio visual materials usage. It could be suggested that availability may explain this result, as rural doctors had less

access to these sources; hence they do not want to consider the importance of different criteria of unavailable information sources.

In addition it was evident that urban and rural doctors are dissimilar regarding ease of use of online databases p-value (χ^2=18.060 DF =1 P=.000) as well as CD databases credibility with p-value (χ^2=17.834 DF =1 P=.000). A smaller proportion of rural doctors (31.7%) considered the ease of use as significant for online databases than did their counterparts in urban areas (67.0%), and a larger proportion of urban doctors (68.8%) believed that credibility influenced their usage of CD databases than did rural doctors (24.4%).

A difference was shown with regard to credibility and the usage of general medical websites with p-value (χ^2=4.418 DF =1 P=.036). Data suggested that a larger proportion of rural doctors (51.2%) put more emphasis on credibility with regard to the usage of general medical websites than did urban doctors (34.0%).

With regard to direct access to experts' websites with a p-value (χ^2=4.165 DF =1 P=.041), here more urban doctors (65.6%) considered instant access as a key factor in comparison to rural doctors (48.8%). In addition there were differences with the ease of use of experts' websites with p-value (χ^2=14.442 DF =1 P=.000), as data showed that a significantly larger proportion of urban doctors (61.4%) highlighted the importance of ease of use on their use of experts' websites compared to rural doctors (29.3%).

Finally there were differences between urban and rural doctors regarding the instant access to professional organization websites with p-value (χ^2=6.493 DF =1 P=.011). Data reported that instant access was believed to influence usage of professional organization websites by more urban doctors (62.8%) than rural doctors (41.5%). In addition, there was a difference regarding to the ease of use of professional organization websites with p-value (χ^2=11.262 DF =1 P=.001). The study showed that more urban doctors (68.8%) than rural doctors (41.5%) thought that using professional organization websites was influenced by ease of use.

8.4 Barriers

Doctors, in order to meet their information needs, encountered a number of barriers. The barriers that were identified in this study can be divided into four main themes: personal barriers, paper related barriers, electronic based barriers and channel related barriers.

8.4.1 Personal barriers.

The barriers that fall under the heading personal included: not enough time to search; self sufficiency (it means that doctors believe that they are qualified and have long experience which has made them knowledgeable and able to fulfil their information needs from their own experience); believing that information sources cannot provide help; believing that colleagues' knowledge is no better than theirs and poor information skills.

Regarding lack of time, data showed that 33 out of 41 (80.5%) of the rural doctors reported that they manage more than fifteen patients per day and 23 (56.1%) of them indicated that the patient consultation sessions last between ten and fifteen minutes, similarly 101 out of 215 (47%) of urban doctors indicated that they manage more than fifteen patients a day and the management session lasts between ten and fifteen minutes. Furthermore doctors indicated that on average, they needed information to answer between five to ten questions per day. This result indicates how busy the doctors are and the extent of their information need. The problem of lack of time was also reported in previous literature, (Dawes and Sampson, 2003; Coumou, 2006 and Nail-Chiwetalu and Ratner, 2007).

Regarding the problem of self sufficiency and believing that information sources cannot provide help, this result is consistent with Helfand (1995) who concluded that primary care doctors are generally motivated to seek answers for their clinical questions only when they are sure that the answer can be obtained. However, although doctors have such beliefs, studies (Gorman et al., 1995 and Chambliss and Conley, 1996) have indicated that medical literature could provide answers to doctors questions and they concluded that paper resources could

have provided answers to approximately half the questions i.e. possibly more frequently than expected by doctors. However, this may be affected by their need to be accessible or doctors knowledge about the available sources, or more time to do the searches, or, more support to access these sources.

8.4.2 Paper related barriers.

The barriers that were identified in reference to the use of paper sources included: availability, short period archives and manually accessed, irregular journal subscription, journal subscription costs and outdated sources.

8.4.3 Electronic based barriers.

The barriers that were identified in reference to the use of electronic sources included: availability and accessibility; limited full text access; cost; no electronic medical records in hospitals; poor computer specification; integration (this was a perceived barrier indicating the difference between health information systems and health equipment, for example medical imaging and laboratory equipment); reliability and authenticity; security (this barrier was a perceived barrier indicating that electronic health information systems should not be hacked easily) and slow speed of electronic equipments. These issues were mentioned in some of the previous studies, for instance Aaronson et al. (2001) reported on the ease and fast access to patient data. Loomis, et al. (2002) reported problems of security and reliability as they found that family doctors who did not use the Electronic Medical Records systems thought that they was not as secure and reliable as paper records. Forrest and Robbt (2000); Loomis et al. (2002) and Miller and Sim (2004) mentioned the problem of integration and showed that doctors were more concerned with Electronic Medical Records systems that can bridge all doctors' practices, laboratories and radiography facilities; in addition Loomis et al. reported the problem costs of Electronic Medical Records systems. Boissin (2005) identified the problems of reliability and authenticity with the internet. D'Alessandro et al. (1998) and Torre et al., (2003) noted that the access point, the location, the ability to log in anywhere was seen to be a critical for using electronic sources.

8.4.4 Channel related barriers.

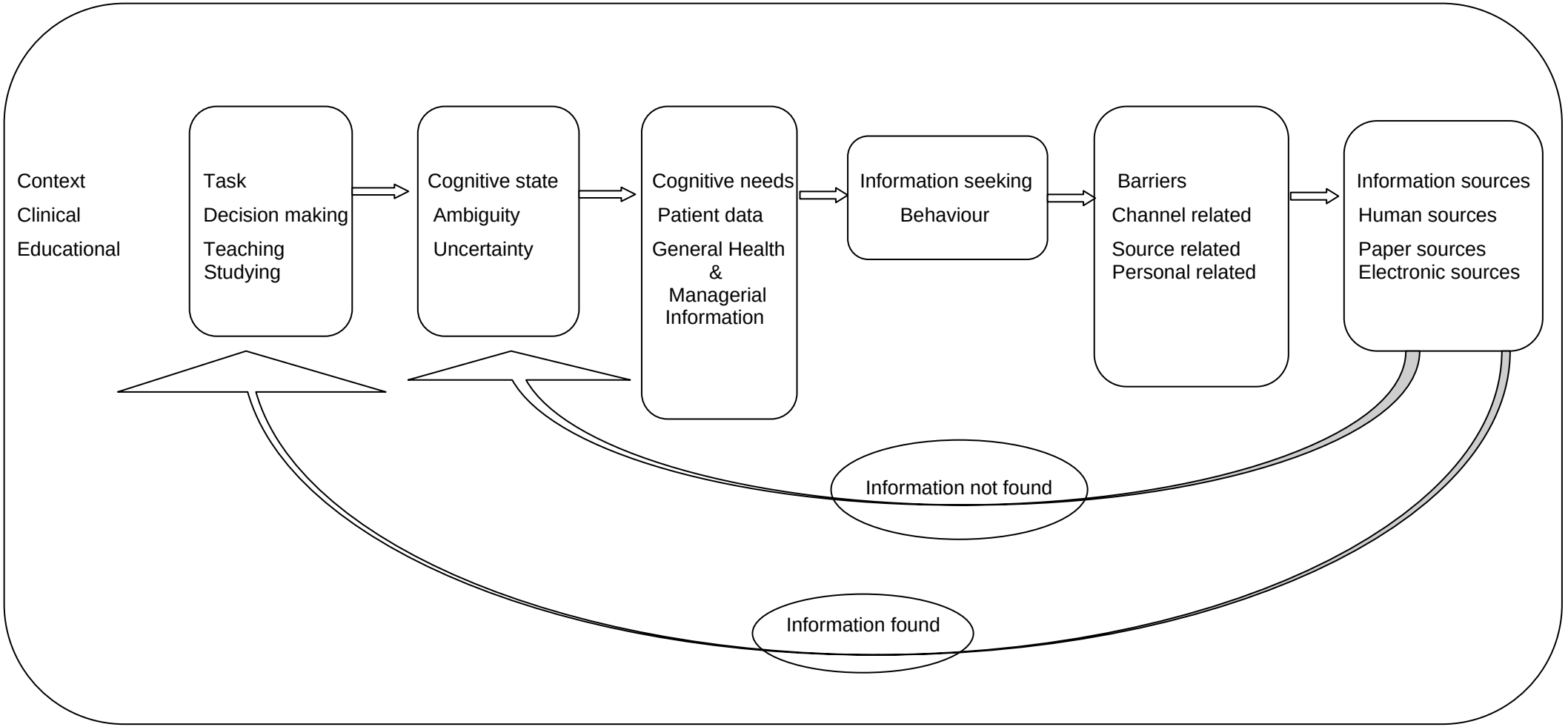
The barriers that fall under the heading channel barriers included: irregular working hours, particularly hospital libraries; hospital libraries were distant from the wards; the libraries did not provide adequate services, such as, current awareness and selective dissemination of information; the libraries were usually crowded (inappropriate place); problem of access and availability where some doctors indicated that although there was a medical library in the hospitals, it was not accessible at all time. In addition the internet service was not available in some of the hospitals.

The comparison between urban doctors and their counterparts in the rural area shows that statistical differences were evident with regard to barriers facing urban and rural doctors. First there was a statistical difference in reference to the credibility issue with journal articles p-value (χ^2= 4.337 DF =1 P=.037). Data suggest that a larger proportion (59.1%) of urban doctors than rural doctors (41.5%) believed that they have a credibility issue with journal articles.

Also there was a difference regarding skills of finding information in books with p-value (χ^2=4.244 DF =1 P=.039), where a large proportion of rural doctors (26.8%) thought that they were facing problems when searching for information in books compared to 14% of urban doctors. Moreover, a significance difference was shown in reference to the poor computer specification to search the internet, with p-value (χ^2=10.789 DF=1 P=.001); online databases p-value (χ^2=8.904 DF =1 P=.003) and statistical differences regarding searching CD databases with p-value (χ^2=3.916 DF =1 P=.048). Data suggested that rural doctors encountered these problems more than did urban doctors. Finally there was evidence that urban doctors were not the same as rural doctors regarding the problem of electronic speed when searching the internet, with p-value (χ^2=6.340 DF =1 P=.012). Results indicated that more rural doctors (75.6%) than urban doctors (54.4%) believed that surfing the internet was affected by the low electronic speed.

In conclusion figure (8.35) indicates that doctors' information needs evolved from contexts, such as, clinical practices and education (both teaching and studying). Within these contexts there were particular tasks that needed to be performed, such as decision making (decision making here refers to identifying the best method for investigation such as, medical imaging or/and laboratory tests to diagnose a patient health problem in order to decide appropriate treatment). However, these tasks sometimes were associated with different types of difficulty that, cognitively, created ambiguity and uncertainty. In order to manage their cognitive state doctors needed various types of information, such as patient based information, general health information and managerial information. To fulfil their cognitive needs doctors used a variety of information sources that they accessed through different types of channels. However, doctors were confronted with a wide range of barriers that influenced their use of different channels, as well as, their usage of different information sources

Figure (8.35) Doctors' information needs and information seeking behaviour framework



Chapter nine Conclusion

9.1 Conclusion

The main aim of this study was to investigate the information needs and the information seeking behaviour of Libyan doctors who work in an urban area and those who work in a rural area in Libyan hospitals. The specific objectives of this study intended to: identify the information needs of urban and rural Libyan doctors working in Libyan hospitals; identify the situations and the personal contexts that were associated with the information needs of urban and rural doctors working in Libyan hospitals; identify how urban and rural doctors working in Libyan hospitals seek information; identify whether the medical libraries and librarians have any influence on the information seeking behaviour; identify the information sources used; and identify the information channels that were utilized and the characteristics of the preferred information sources. Furthermore to identify the obstacles that hampered urban and rural doctors and that created barriers to satisfying their information needs.

This research study, although it can be categorized as an exploratory study, it also has an explanatory component whereby the influence and validity of previously identified variables were also explored. In order to achieve the study aim and objectives a multi-method approach (both quantitative and qualitative) was chosen to guide the research process. The main reasons behind this decision were: to increase the understanding from the quantitative perspective about Libyan doctors' information needs and information seeking behaviour and enabling validation of the previous studies, finally to integrate the advantages of both methods. The qualitative methodology was chosen in this study to investigate doctors' information needs as well as to help understand the reasons for information seeking behaviour from their perspectives. The quantitative methodology enabled comparisons to be made between variables and to identify any differences or similarities between them.

The strategy that was chosen to conduct the mixed method approach was the "Concurrent triangulation strategy". With this strategy there was no need to collect the quantitative and qualitative data at different stages in the research, rather it was collected in tandem, and equal emphasis was given to the qualitative

and quantitative methods. The results of both qualitative and quantitative data were integrated in the discussion.

The exploratory survey method was chosen to help to investigate correlations between variables such as gender, age, workplace, speciality, professional degree, occupation and doctors' information needs as well as to help to illustrate the characteristics of doctors' information seeking behaviour and their information needs.

With regard to the specific research techniques, for the purpose of this study a paper based questionnaire and face to face interviews (along with critical incident techniques embedded in the interview) were chosen as research techniques for data collection.

The questionnaire was chosen as a technique, so that data could be collected from a considerable number of people (1029 doctors in this study) at a low cost (time, effort and money). As the study included Libyan doctors who were located in different parts of Libya, the questionnaire helped to eliminate the geographical limitations and costs (time, effort and money). The questionnaire also offered confidentiality and anonymity. In addition, it was convenient for doctors who could take the questionnaire home and then bring it back later which may have increased the response rate.

The in-depth one to one interview technique was chosen as it offered the opportunity to obtain detailed information by asking doctors to explain their response; describe their experiences; provide examples; and so that they could use their own words. Because face to face interview is flexible there was the opportunity to repeat or explain unclear questions which in turn encouraged doctors to respond. The face to face interview was also was chosen to explore initial findings from the questionnaire (based on a quick but not final analysis of the questionnaires) as well as to collect more in-depth information about the issues that were not investigated in-depth in the questionnaire. Hence, the interviews overcame the weaknesses, to some extent, of the closed questions of the questionnaire by offering the opportunity for more detailed comments about

particular issues. The face to face interviews also avoided the influence of peer pressure, or potential embarrassment due to ignorance.

Drawing on ideas from the previous literature and the variables that have been identified in the previous information behaviour research, the questionnaire was distributed first. This eased the process of gaining interviews and stimulated the participants' thoughts. The total of valid questionnaires was 256 and there were thirty four interviews with Libyan doctors working in Libyan hospitals.

9.2 Meeting the Objectives

Based on the analysis and the discussion it could be argued that, to a large extent, the aim and objectives of this research work were achieved. First, the study answered a question formulated to identify rural and urban information needs. Data demonstrated that rural and urban doctors, although similar, placed greater emphasis of different types of information. Information needs that were identified included: patient based information, such as personal information, patient medical history, patient medical images, patient clinical results and patient family history as well as; general health information, for example disease information (physical signs and symptoms, aetiology and disease condition); medical imaging and clinical laboratory testing information; treatment information (drug information (drug usage, dose, effectiveness, side effects and drug formula and interaction), management process, evidence based medicine and medical complications); drug abuse; mechanisms of recreational drugs and chemical substances in food; managerial information for instance medical guidelines; referral information; new medical developments and statistics. However, there was no statistical difference between urban and rural doctors information needs.

Secondly, the study indicated the reasons and purposes for which information was needed. These included keeping up to date and continuing medical education; answering a colleague's question; answering a patient and their family's questions; writing research papers and knowing the meaning of abbreviations. However, data revealed a statistical difference between urban and rural doctors regarding the usage of treatment information to write research

papers; medical knowledge to answer colleague questions; referral information to care for the patient and education purposes and finally the utilization of information about new medical equipment to keep up to date.

Thirdly, the study provided an insight into the context in which information was needed; whereby doctors needed information in contexts such as clinical practice in which patient care and decision making were the type of tasks that were identified and education with both teaching and studying tasks. The study proved there was no difference between urban and rural doctors concerning their use of different information in the context of patient care. However the outcomes indicated that there was statistical evidence that there was a difference between doctors who were involved in teaching and those who were not. The difference was evident concerning the need for information about psychological aspects of the disease, medical knowledge in general and population statistics. Furthermore, ambiguity and uncertainty was identified as the main motivation for information needs.

Fourthly, the study provided information about the channels that are used by doctors to access different information sources. It was demonstrated that Libyan doctors used different channels to access information sources. These channels included libraries; human sources; the internet; morning meeting reports; workshops; medical symposia and conference activities; seminars and group discussions; drug companies; personal computers; workplace computers and telephones. The libraries that were used to access information sources encompassed libraries such as, personal library, the library of the Libyan Board of Medical Specialities, hospital library and medical faculty library. However, although this research reported on the channels that were highly used by urban and rural doctors including their personal library and the internet, the medical faculty library was the least frequently used by both urban and rural doctors. Though the study showed no difference between urban and rural doctors regarding those channels, it was apparent that there was a statistical difference between urban and rural doctors regarding the usage of the hospital library. Data suggested that urban doctors used the hospital library more than did their counterparts in the rural areas.

Fifth, the study identified the different information sources used by Libyan doctors to acquire information. These included human sources; paper sources; electronic sources; lectures and drug company presentations. The human sources involved: colleagues; specialists and consultants in the hospital; visiting doctors; company representatives and external experts. The paper sources included books; journals; conference and research papers; pamphlets and medical atlas. The electronic sources included formal and informal sources; CD databases; international databases and video cassettes. Comparisons between urban and rural doctors showed that they were similar with reference to their use of books as a first source to be consulted, followed by general medical websites after consulting human resources with non acute patient status. In addition they were similar in their low usage of online databases. The study identified factors that were believed to influence doctors' information source usage. These included: availability; ease of access; mobility; up to dateness; reliability; accuracy; credibility and authoritativeness; comprehensiveness; ease of use and compatibility with health equipment.

Sixth, this research identified some barriers that were believed to have affected doctors' information seeking behaviour. The barriers comprised: availability; inconvenient environment and location of library; access problems; outdated library sources; limited full text access; poor computer specifications; irregular subscriptions; subscription costs; lack of time to search; poor information skills; no electronic medical records; self sufficiency; belief that information sources cannot help with some health issues; the belief that colleagues' knowledge is not better than theirs; no integrated systems; security; weak bandwidth; archives for short periods and manual access to archives; no current awareness and selective dissemination of information and irregular working hours of hospital libraries.

The study reported statistical differences between urban and rural doctors regarding the poor computer specifications and weak bandwidth to surf the internet or online and CD databases. It was shown that more rural doctors encountered such barriers than did their counterparts in urban areas.

9.3 Summary

To sum up it appears that doctors' information needs are higher in the context of clinical and educational work, within which they are supposed to achieve particular tasks, such as decision making, managing patient health problems, teaching or studying. In the course of accomplishing their tasks, doctors encountered patients with different health problems. Some of the health problems are clear and easily managed; however, others are less clear and led doctors to be anxious. Anxiety was due to either experiencing uncertainty or ambiguity. Uncertainty occurred when doctors had a lack of information to judge the effect of their intervention on a health problem. They may think that they are aware of what to do and what results they are seeking but may not be sure of the impact of their intervention. With regard to ambiguity it came about when doctors lacked clarity. For example, if they were not satisfied with their understanding of the problem and what was involved in resolving the problem and where they were not sure of the final result that they were seeking.

Such a psychological state had implications for their knowledge state. Data showed that doctors needed different types of information in order to manage their knowledge state, which in its turn may help to complete the task. The different types of information were clustered under three main categories: patient data, general health information and managerial information.

Thus to acquire such information doctors searched for information either themselves or through a mediator. Information searching involved different types of information sources, which may be human, paper or electronic based sources, through different channels, which may be personal, hospital, university, medical organisation libraries or through the internet.

However, doctors encountered different types of barriers that affected their access to information that could fulfil their needs. The different barriers were associated with personal issues such as self sufficiency, and paper or electronic based issues such as availability and accessibility as indicated above.

9.4 The limitations of the work

The work presented in this thesis has some limitations; one of the limitations of this study was with regard to the qualitative study. The qualitative study was performed using one to one interviews with volunteer doctors. It is possible there might have been some discrepancy between the doctors who volunteered and non volunteers. Such a difference was not investigated in this study.

Another limitation was concerned with collecting both qualitative and quantitative data at the same time. It might have been better to have collected qualitative data before the quantitative investigation. However due to limitation of time and finances this was not possible.

One other limitation to this study was that it seemed from the research that younger people had different attitudes to electronic sources compared to older people; however, this difference was not investigated in detail.

9.5 The study contribution

The study does not claim that the findings are unique in comparison to previous research. However this study has contributed to the literature as it investigated people in a geographical context that had not been investigated before regarding their information needs and their information seeking behaviour.

In addition this study compared urban and rural doctors' information needs and information seeking behaviour. Although there are some studies that investigated such issues before, those studies did not limit their research to doctors. Other studies included in their research other medical professionals and this may have influenced their results in terms of depth and detail.

What is more some of these studies did not compare urban and rural doctors in one single study, where it was possible to systematically see the influence of the different factors that may influence the findings in the different settings.

Finally this study provided additional insights into the relationship between cognitive factors, such as ambiguity and certainty and how they were related to doctors' information seeking behaviour.

9.6 The study implication

The factors, explored and identified in this thesis and that have an impact on Drs' information behaviour are of significance to information service providers. Taking on board some of these findings would enable service providers to provide a better information service and improve their systems and, hence, will be able to respond to doctors' information needs. For example, many doctors made a demand for a current awareness and selective dissemination of information service. Hence, medical libraries should consider such services, services that are proactive and establish a presence rather than expecting doctors to seek out library sources and services.

In addition, to help develop the information skills of Doctors, which the study identified as lacking, libraries could provide continuing education activities that emphasize information literacy for doctors. In addition, information providers should contribute their expertise to help design information skills curriculum for the medical faculty in order to better prepare students to become more effective professionals. Furthermore, medical libraries should be more flexible by providing doctors convenient access to information sources through the internet.

From a theoretical perspective, although radically new factors that affect information behaviour have not been discovered, this research serves to support previous research and provides depth and comprehensively integrates the broad range of factors, in relation to the medical population, which has not been done before.

9.7 Further work

This study indicated that age might be a significant factor for information seeking behaviour. However, additional research could be undertaken to explore further the relationship between age and people's attitude to information sources

and information seeking behaviour. This has not been explored in depth by other authors.

Other work which could be done would be to investigate in more detail the influence of context on information needs, and how doctors' information needs changed in specific contexts.

Baring in mind the limitation of this work, this research can be seen to have provided a unique insight into the information needs and information seeking behaviour of doctors in Libyan hospitals. It is suggested that on the basis of this work improvement can be made with regard to the information capability of doctors and the provision of information services.

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Appendices

Appendix one: questionnaire.

Dear doctor

This questionnaire has been designed to collect some data from doctors to help understand doctors' information needs and their information seeking behaviour in order to develop health information system that can response to their needs at time of need.

This component will feature as part of the completed dissertation paper, which aims to gather a random selection of qualitative and quantitative data for.

Your response is greatly appreciated and should only take a few minutes.

Thank you for your response.
The researcher

Personal information

1-Age: …… 2-Gender: Male ☐ Female ☐

Job information

3-Speciality: …… 4-Job title: ……

5- What other work are you engaged in? (Choose all that apply)

Research ☐ Teaching ☐ Management ☐ Further study ☐

Other specify …… Non ☐

6-How long usually does the patient consultation last?

Less than 15 minute ☐ 15 to 30 minute ☐ More than 30 minute ☐

7- On average how many patients do you manage in typical day work?

Less than 10 ☐ between 10 to15 ☐ more than 15 ☐

8-On average how many questions do you ask about patients cases and seek answers for them using information sources?

Less than 5 ☐ between 5 to10 ☐ more than 10 ☐

Information needs

9- Please state how important the following kinds of information are?

Importance / Information	V. high	high	To some extent	Low	V. Low
About patient data					
About diagnosis					
Physical symptoms					
About disease conditions					
Disease psycho. aspects					
About lab tests & results					
About treatment					
About drugs					
About medical knowledge					
About population statistic					
Referral information					
About new Med. Equips.					
Any other ……..	……	…….	……	…….	…….
……	……	…….	……	…….	…….

10-For what purpose do you usually need the following kind of information? (Choose all that apply)

purposes / Information	To be up to date	Patient care	Education purpose	To write journal articles	Answer patients/ families questions	Answer colleague questions	Other (please specify)
About patient data							
About diagnosis							
Physical symptoms							
disease conditions							
Disease psycho. aspects							
lab tests & results							
About treatment							
About drugs							
medical knowledge							
population statistic							
referral information							
New Med. Equips.							
Any other ……..	…….	……	……	…….	……	……	……
……	…….	……	……	…….	……	……	…….

Information channels

11-When you need professional information where do you usually seek that information?

Rank the following channel where 1 is most common and 5 is least common.

Colleagues ☐ Hospital library ☐ Personal library ☐ Medical faculty library ☐ Internet ☐

Any other channels used? (Specify in order please)……..……...

……

12-How frequently do you use the different channels to find professional information?

Frequency of use / Channel	Daily	Weekly	Every 2 weeks	Monthly	more than month
Hospital library					
Med. faculty library					
Colleagues					
Internet					
Others……	……	…….....	……	……	……
……	……	…….....	……	……	…….....

13-How easy to get access to the following information channels?

Ease to access / Channel	V. easy (more than 80%)	Easy (60% to 80%)	To some extent (40% to 60%)	Difficult (20% to 40%)	V. difficult (Less than 20%)
Hospital library					
Med. faculty library					
Colleagues					
Internet					
Others……	……	…….....	……	……	…….....
……	……	…….....	……	……	…….....

14- How satisfied are you with the available information services in the following channels?

Satisfaction / Channel	V. satisfied (more than 80%)	Satisfied (60% to 80%)	Some extent (40% to 60%)	Unsatisfied (20% to 40%)	V. unsatisfied (Less than 20%)
Hospital library					
Med. faculty library					
Internet					
Others……	……	…….....	……	……	…….....

Information Sources

15- To meet your professional information needs, could you please rank (1-11) the following information sources according to your actual use.

Sources	Currently used
Books	
Journal articles	
Proceedings	
Professional newsletters	
Personal contacts	
Audio-visual materials	
Online databases	
CD-Rom	
General medical websites	
Specialists' websites	
Professional organisation websites	
Others……	……
……	……

16- What are the characteristics that might influence using information sources? (Choose all that apply)

Characteristics / sources	Availability	Instant access	credibility	Ease of use	Others please specify
Books					
Journal articles					
Proceedings					
Prof. newsletters					
Personal contacts					
Audio-visual mat.					
Online databases					
CD-Rom					
General med. sites					
Specialists' sites					
Prof. org. sites					
Others……	……..	…….	…….	……	…….....
……	……..	…….	……...	……	…….....

17-What purposes do you use the following information sources? (Choose all that apply)

purposes / Sources	To be up to date	To confirm opinion	For patient care	Education purpose	To write journal articles	Answer patient/ families questions	Answer colleague question	Other (please specify)
Books								
Journal articles								
Proceedings								
Prof. newsletters								
Personal contacts								
Audio-visual mat.								
Online databases								
CD-Rom								
General med. sites								
Specialists' sites								
Prof. org. Sites								
Others……	…….	…….	…….	…….	…….	…….	…….	……..….
……	…….	…….	…….	…….	…….	…….	…….	…….

18-How satisfied are you with the retrieved information that you get when you search from?

Satisfaction / sources	v. satisfied (More than 80%)	satisfied (60% to 80%)	some extent (40% to 60%)	Unsatisfied (20 to 40%)	v. unsatisfied (Less than 20%)
Books					
Journal articles					
Proceedings					
Prof. newsletters					
Personal contacts					
Audio-visual mat.					
Online databases					
CD-Rom					
General med. websites					
Specialists' websites					
Prof. org. websites					
Others……	……..	…….....	……	……..	…….....
……	……..	…….....	……	……..	…….....

Information Skills

19-Do you prefer searching professional information

On your own ☐ Having it done by mediator ☐

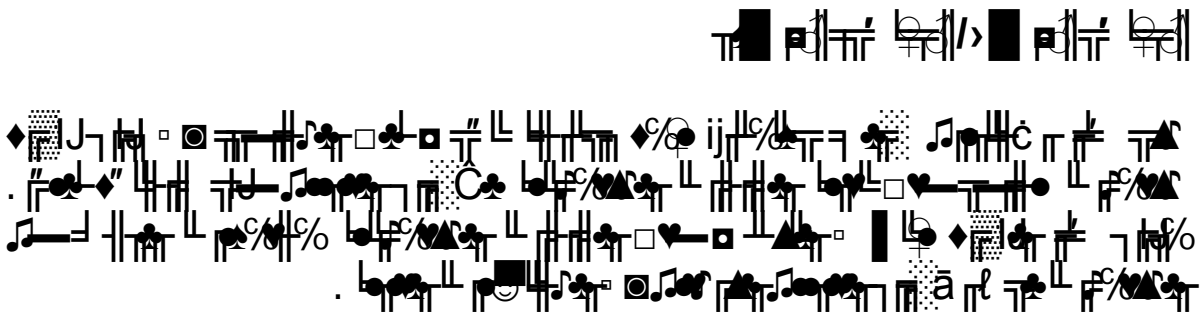
20-Do you prefer that a medical librarian conduct a search for you?

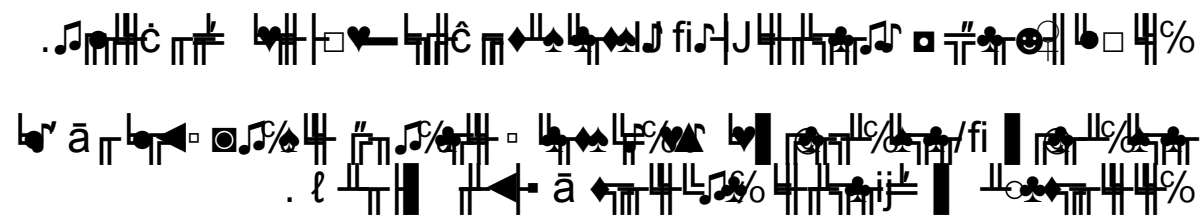
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

21-When you search by yourself do you think it is easy to get what you want?

Ease of search / sources	V. easy (More than 80%)	Easy (60% to 80%)	Some extent (40% to 60%)	Difficult (20 to 40%)	V. difficult (Less than 20%)
Libraries					
Online databases					
CD-databases					
General med. websites					
Specialists' websites					
Prof. org. websites					
Personal contacts					
Others……	……	…….....	……	……	…….....
……	……	…….....	……	……	…….....

Appendix two: Arabic questionnaire.





البيانات الشخصية

1/ العمر..... 2/ الجنس ذكر ☐ أنثى ☐

معلومات العمل

3/ التخصص..... 4/الوظيفة.....

5/ ما هي الأعمال الأخرى التي تزاولها (يمكن اختيار أكثر من إجابة)

بحث ☐ تدريس ☐ إدارة ☐ دراسات متقدمة ☐ أخرى (حدد رجاءً)..... لا أزاول عمل آخر ☐

6/عادةً كم تستغرق الجلسة الواحدة لمعالجة المريض: أقل من 10 دقائق ☐ من 10 إلى 15 دقيقة ☐ أكثر من 15 دقيقة ☐

7/ ما هو متوسط عدد الحالات التي تعالجها في يوم عمل: أقل من 10 مرضى ☐ من 10 إلى 15 مريض ☐ أكثر من 15مريض ☐

8/ ما هو متوسط عدد الأسئلة التي تسألها بخصوص حالة المريض وتبحث عن إجابات لها في مصادر المعلومات المختلفة:

أقل من 5 ☐ من 5 إلى 10 ☐ أكثر من 10 ☐

الحاجة للمعلومات

9/ رجاءً حدد مدى الحاجة لأنواع التالية من المعلومات

درجة الحاجة / المعلومات	عالية جداً	عالية	إلى حد ما	منخفضة	منخفضة جداً
بيانات المريض					
معلومات التشخيص					
الأعراض المادية					
ظروف المرض					
الآثار النفسية للمرض					
النتائج والاختبارات المعملية					
حول العلاج					
حول العقاقير					
المعارف الطبية					
إحصاءات السكان					
معلومات التحويل					
التجهيزات الطبية الحديثة					
أخرى.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....

10/ رجاءً حدد الأغراض التي تحتاج فيها للأنواع التالية من المعلومات (يمكن اختيار أكثر من إجابة)

الغرض / المعلومات	لتحديث المعلومات	للعناية بالمريض	لكتابة مقالات الدوريات	لأغرض تعليمية	إجابة أسئلة المرضى وعائلاتهم	لإجابة أسئلة الزملاء	أخرى (حدد رجاءً)
بيانات المريض							
معلومات التشخيص							
الأعراض المادية							
ظروف المرض							
الآثار النفسية للمرض							
النتائج والاختبارات المعملية							
معلومات العلاج							
معلومات العقاقير							
المعارف الطبية							
إحصاءات السكان							
معلومات التحويل							
التجهيزات الطبية الحديثة							
أخرى.....							
.....							

قنوات المعلومات

11/ عندما تحتاج للمعلومات المهنية عادة أين تبحث عن تلك المعلومات؟ رجاءً رتب القنوات التالية حيث 1 تساوي الأكثر شيوعاً و 5 الأقل شيوعاً

الزملاء ☐ مكتبة المستشفى ☐ المكتبة الشخصية ☐ مكتبة الجامعة الطبية ☐ الإنترنت ☐ أخرى حدد.....

12/ ما مدى تكرار استخدامك للقنوات التالية للحصول على المعلومات المهنية:

تكرار الاستخدام / القناة	يومياً	أسبوعياً	كل أسبوعين	شهرياً	لك رثكا نم رمش
مكتبة المستشفى					
مكتبة الجامعة الطبية					
الزملاء					
الإنترنت					
أخرى.....					
.....					

13/ ما مدى سهولة الوصول للقنوات التالية

سهولة الوصول / القناة	سهلة جداً (أكثر من 80%)	سهلة (60% إلى 80%)	إلى حد ما (40% إلى 60%)	صعبة (20% إلى 40%)	صعبة جداً (أقل من 20%)
مكتبة المستشفى					
مكتبة الجامعة الطبية					
الزملاء					
الإنترنت					
أخرى.....					
.....					

14/ ما مدى رضاك عن خدمات المعلومات المتاحة في القنوات التالية

الرضا / القناة	راض جداً (أكثر من 80%)	راض (60% إلى 80%)	إلى حد ما (40% إلى 60%)	غير راض (20% إلى 40%)	غير راض جداً (أقل من 20%)
مكتبة المستشفى					
مكتبة الجامعة الطبية					
الإنترنت					
أخرى.....					
.....					

مصادر المعلومات

15/ لتلبية حاجتك من المعلومات المهنية رجاءً رتب من 1 إلى 11 مصادر المعلومات التالية حسب استخدامك الفعلي لها

المصادر	الترتيب
الكتب	
مقالات الدوريات	
بحوث المؤتمرات	
النشرات المهنية	
الزملاء	
المواد السمعية والبصرية	
قواعد البيانات على الخط المباشر	
الأقراص الليزرية	
المواقع الطبية العامة على الإنترنت	
مواقع المتخصصين والخبراء على الإنترنت	
مواقع المؤسسات المهنية على الإنترنت	
أخرى.....	
.....	

16/ ما هي الخصائص التي تعتقد أنها تؤثر في استخدام مصادر المعلومات المختلفة؟ (يمكن اختيار أكثر من إجابة)

الخصائص / المصادر	الإتاحة	الوصول المباشر	الموثوقية	سهولة الاستخدام	أخرى (حدد رجاءً)
الكتب					
مقالات الدوريات					
بحوث المؤتمرات					
النشرات المهنية					
الزملاء					
المواد السمعية والبصرية					
قواعد البيانات على الخط المباشر					
الأقراص الليزرية					
المواقع الطبية العامة على الإنترنت					
مواقع الخبراء على الإنترنت					
مواقع المؤسسات المهنية على الإنترنت					
أخرى.....					
.....					

17/ ما هي الأغراض التي تستخدم فيها مصادر المعلومات التالية ؟ (يمكنك اختيار أكثر من إجابة)

الغرض / المصادر	لتحديث المعلومات	لتأكيد رأي	للعناية بالمريض	لأغراض تعليمية	لكتابة مقالات الدوريات	لإجابة أسئلة المرضى وأسرهم	لإجابة أسئلة الزملاء	أخرى (حدد)
الكتب								
مقالات الدوريات								
بحوث المؤتمرات								
النشرات المهنية								
الزملاء								
المواد السمعية والبصرية								
قواعد البيانات على الخط المباشر								
الأقراص الليزرية								
المواقع الطبية العامة على الإنترنت								
مواقع الخبراء على الإنترنت								
مواقع المؤسسات المهنية على الإنترنت								
أخرى.....								
.....								

18/ ما مدى رضاك عن المعلومات المسترجعة نتيجة لبحثك في المصادر التالية ؟

مدى الرضا / المصادر	راض جداً (أكثر من 80%)	راض (60% إلى 80%)	إلى حد ما (40% إلى 60%)	غير راض (20% إلى 40%)	غير راض جداً (أقل من 20%)
الكتب					
مقالات الدوريات					
بحوث المؤتمرات					
النشرات المهنية					
الزملاء					
المواد السمعية والبصرية					
قواعد البيانات على الخط المباشر					
الأقراص الليزرية					
المواقع الطبية العامة على الإنترنت					
مواقع الخبراء على الإنترنت					
مواقع المؤسسات المهنية على الإنترنت					
أخرى.....					
.....					

المهارات المعلوماتية

19/ هل تفضل بحث المعلومات المهنية: بنفسك ☐ عن طريق وسيط (مكتبي مثلاً) ☐

20/ هل ترغب في قيام وسيط (مكتبي مثلاً) بالبحث عن المعلومات لأجلك :

دائما ☐ عادةً ☐ أحياناً ☐ نادراً ☐ لن أفعل ☐

21/ عندما تقوم بالبحث بنفسك هل تعتقد أنه من السهل أن تجد كل ما تريد من معلومات من المصادر التالية؟

سهولة البحث / المصادر	سهلة جداً (أكثر من 80%)	سهلة (60% إلى 80%)	إلى حد ما (40% إلى 60%)	صعبة (20% إلى 40%)	صعبة جداً (أقل من 20%)
المكتبات					
قواعد البيانات على الخط المباشر					
قواعد البيانات على الأقراص					
الموقع الطبية العامة على الإنترنت					
مواقع الخبراء على الإنترنت					
مواقع المؤسسات المهنية على الإنترنت					
الزملاء					
أخرى.....					

22/ هل تستخدم المعاملات التالية عندما تبحث المصادر الإلكترونية ؟ (يمكنك اختيار أكثر من إجابة)

المعاملات البولينية (و، أو، لا) نعم ☐ لا ☐ بحث الحقول (كالعنوان والمؤلف) نعم ☐ لا ☐

أكثر من مصطلح واحد نعم ☐ لا ☐ البتر (التعويض عن حرف بعلامة ما) نعم ☐ لا ☐

23/ في هذا السؤال ستجد مجموعة من المشاكل التي يمكن أن تواجهك عند بحث المصادر الورقية وأخرى عند بحث المصادر الإلكترونية أو مع كليهما رجاءً حدد ما إذا كنت تواجه أي من هذه المشاكل قرين كل مصدر؟ (يمكنك اختيار أكثر من إجابة)

المصدر / المشاكل	الكتب	مقالات الدوريات	بحوث المؤتمرات	النشرات المهنية	قواعد البيانات على الخط المباشر	قواعد البيانات على الأقراص	الإنترنت	الاتصالات الشخصية	أخرى (حدد)
عدم توفر مصادر المعلومات									
عدم توفر معلومات موثوقة (معلومات قديمة مثلاً)									
لأني مشغول لا أجد الوقت الكافي للبحث									
عدم ملائمة مكان مصادر المعلومات (المكان بعيد أو غير مناسب)									
ضعف مهارات بحث المصادر الو رقية									
ضعف مهارات استخدام الكمبيوتر									
ضعف مهارات بحث المصادر الإلكترونية									
ضعف مواصفات الكمبيوتر									
ضعف السرعات الإلكترونية (للإنترنت أو قواعد البيانات مثلاً)									
أخرى.....									
.....…….....……									
.....…….....……									

هل تسمح بالاتصال بك للمزيد من الأسئلة إذا كنت موافقاً رجاءً وليس أمراً زود المعلومات التالية:

الاسم:.....

الهاتف:.....

البريد الإلكتروني:.....

Appendix three: The interview.

1- Could you tell me about what you usually do in day to day work? And what are the steps that you need to follow to finish your work? (relate data collected to work activity)

2- What information sources do you think that can help you achieve your day to day work? Please tell me about how they can help you?

3- Do these sources are the preferred sources to you to use? Why? Why do not use the other kind of information sources?

4- Where do you get this information sources? Where do you think it should be?

5- What information sources are available to you?

6- What do you think about having information professional to go to help meet your information needs? And why?

7- Could you suggest how should access to information be improved?

8- Could you tell me when do you usually need information?

Critical incident

Could you describe a recent issue for which you searched information? Please describe what was the issue, what was the questions in your mind, what were you trying to do (what is the situation), what did you feel in that situation, what did you do to answer the questions (how do you find the answer), why did you choose to use that way to answer the questions, are there any other ways but you choose not to use them, why, did you get an answer to your questions, does it help you, how, how satisfied with the answer that you get, how did you use and apply the information, is there anything else that might explain why you asked that questions.

Appendix four: The Professional Development courses attended in the first, second and third year.

Loughborough University

Postgraduate Research Student Skills Training Record

Year	**2010 / 2011**

Department-based training
(including external training approved by the Department, but not UK GRAD courses, Professional Development courses or other activities validated by Professional Development or supervisor)

Name of Student	ID	Full-time or part-time
Ali Salem Khalil Mohamed	A738359	Full-Time

Name(s) of Supervisor(s)	Department
D. Mark Hepworth And Dr. Janet Harrison	Information Science

Activity	**Skills addressed (see skills matrix for code)**	**Time claimed in days**	**Date completed**	**Supervisor Initials**
Postgraduate Research Students Induction	B2,B4,C2,D6	1 day	Tue 30/10/2007	
Making More out of Outlook		¼	Thu 29/11/2007	
PowerPoint 2003: an Introduction	B6,C4	¼	Thu 6/12/2007	
Online Courses - enrolment and drop in centre	C4	¼	Mon 10/12/2007	
The Enterprising Researcher	B7,G1	½	Mon 7/1/2008	
Conference Presentation Skills - Part A	B6,E2	½	Fri 11/1/2008	
Managing Projects for Postgraduates and Research Assistants	B5,C1,F2	½	Mon 14/1/2008	
Qualitative Analysis - an Introduction to Collecting and Analysing - Part A	A4	½	Tue 15/1/2008	
Ethical Thinking in Research	B2,B3,D6	½	Wed 16/1/2008	
SPSS - Part A		¼	Wed 16/1/2008	

Activity	Skills addressed (see skills matrix for code)	Time claimed in days	Date completed	Supervisor Initials
Career Management for Postgraduate Researchers - Career Planning	G2,G3	½	Thu 17/1/2008	
Creative Thinking	A2,D2,D3	¼	Fri 18/1/2008	
Ethics and Governance in Health Care Research	B2,B3	½	Fri 18/1/2008	
Finding Research Information	A3	½	Tue 22/1/2008	
Qualitative Analysis - an Introduction to Collecting and Analysing - Part B	A4	½	Tue 22/1/2008	
SPSS - Part B		¼	Wed 23/1/2008	
Career Management for Postgraduate Researchers - Successful Applications	G4	½	Thu 24/1/2008	
Conference Presentation Skills - Part Bii	B6,E2	½	Fri 25/1/2008	
Planning and Designing for Occasional Teaching	E5	½	Tue 29/1/2008	
Career Management for Postgraduate Researchers - Interviews	G1,G4	½	Thu 31/1/2008	
Teaching Skills for Postgraduates and Research Assistants with Supervising Practical Activities	E5	½	Tue 5/2/2008	
Keeping your Research Up-to-Date for Postgraduates	A3,C3	½	Thu 7/2/2008	
Presenting for Effective Learning	C4,E2,E5	½	Fri 8/2/2008	
Designing and Producing Conference Posters	E2	½	Mon 11/2/2008	
RefWorks - In Depth	C2,C4	½	Tue 12/2/2008	
Networking Skills - Attending Conferences	F1	½	Thu 14/2/2008	
Getting the Most out of Supervision	D1,D7,F1,F2,F3	½	Mon 18/2/2008	
Marking for postgraduates & research assistants	E5	½	Tue 19/2/2008	

Activity	Skills addressed (see skills matrix for code)	Time claimed in days	Date completed	Supervisor Initials
Statistics: Hypothesis Testing	A4	¼	Tue 19/2/2008	
Introduction to the Job of Lecturer for Postgraduates and Research Assistants	G1	¼	Fri 22/2/2008	
Access 2003: an Introduction - Part A	C4	¼	Thu 13/3/2008	
Access 2003: an Introduction - Part B	C4	¼	Thu 20/3/2008	
Access 2003: an Introduction - Part C	C4	¼	Thu 27/3/2008	
Report Writing	A6,E1,E2	½	Mon 7/4/2008	
Reading for Research	A1,A3,A5,B1 ,C3	½	Wed 9/4/2008	
Plagiarism, Citation and Managing Your References	B2,C4,E1	½	Wed 23/4/2008	
What is a Literature Review?	A1,A3,A5	¼	Mon 12/5/2008	
Writing up your PhD Thesis	C4,E1	½	Thu 2/10/2008	
VIVA - What Happens?	B6,E3	½	Fri 10/10/2008	
Interviewing Skills	G4	½	Mon 13/10/2008	
Questionnaire Design	A4,C2	¼	Wed 15/10/2008	
Introduction to Statistical Methodology	A4	¼	Wed 29/10/2008	
Paired and Unpaired T-tests	A4	¼	Wed 5/11/2008	
Self and Peer Assessment	F1	½	Thu 6/11/2008	
Grammar, Punctuation and Proofreading	E1	1 day	Thu 20/11/2008	
Chi-squared Tests (analysing two-way tables)	A4	¼	Wed 26/11/2008	
Non-parametric Tests	A4	¼	Wed 26/11/2008	

Activity	Skills addressed (see skills matrix for code)	Time claimed in days	Date completed	Supervisor Initials
Introduction to Analysis of Variance (ANOVA)	A4	¼	Wed 3/12/2008	
Personal Organisation and Time Management for PGRs	C1,D4,D5,D7	½	Tue 9/12/2008	
International PhD Careers Forum	3A,3B	½	Tue 18/6/2009	
Increasing Your Productivity by Making the Most of Web 2.0	5A	½	Wed 24/6/2009	
Getting Articles Published for Researchers	4A	½	Mon 14/9/2009	
Copy right, not Copycat - Good Academic Practice when Writing your Thesis		½	Tue 26/1/ 2010	
Conference Planning and Organisation for Postgraduate Researchers		½	Thu 4/2/2010	
Citation Searching		¼	Tue 16/2/2010	
Office 2007 & Exchange E-Mail: An Introduction		¼	Thu 25/2/2010	
Statistics - Cluster Analysis	A4	¼	Tue 2/3/ 2010	
Statistics: Factor Analysis	A4	¼	Tue 9/3/2010	
The Enterprising Researcher	1C	½	Mon 15/3/2010	
SPSS: Cluster / Factor Analysis		¼	Tue 16/3/ 2010	
Intellectual Property	1C	½	Mon 26/4/ 2010	
Remote Working: an Introduction to the VPN		¼	Tue 27/4/ 2010	
Commercialising your Research Ideas	1C	½	Thu 6/5/ 2010	
SPSS: Regression		¼	Tue 18/5/ 2010	
Getting Noticed - The Databases that Help you		¼	Thu	

Activity	Skills addressed (see skills matrix for code)	Time claimed in days	Date completed	Supervisor Initials
Choose Where to Publish			10/6/2010	
Commercialisation of Intellectual Property		½	Mon 21/6/ 2010	
Influencing - how to get out of your own way		½	Mon 5/7/ 2010	
Access 2007 Databases - Part A	C4	½	Wed 14/7/ 2010	
Access 2007 Databases - Part B	C4	½	Wed 21/7/ 2010	
Access 2007 Databases - Part C	C4	½	Wed 28/7/ 2010	
Access 2007 Databases - Part D	C4	½	Wed 4/8/ 2010	
Access 2007 Databases - Part E	C4	½	Wed 11/8/ 2010	

This form should be attached to the **Training summary** form and submitted to your Progression Panel.
Last Updated Feb ‘05

Appendix five: General information about Libya and the Libyan health system.

Libya

Geography and population

Libya is located in the centre of the northern continent of Africa between latitudes (18 - 33) and longitudes (9 - 25) eastward, bordering the Mediterranean Sea to the north, with coast length of 1900 kilometres. Libya lies between Egypt to the east, Sudan to the southeast, Chad and Niger to the south, and Algeria and Tunisia to the west. With a total area of million and seven hundred and fifty-nine thousand and five hundred and forty square kilometres (1,759,540 sq km), 679,358 sq mi. A greater part of the country lies within the Sahara approximately 90%. The

free encyclopaedia “Wikipedia” suggests that Libya is the fourth largest country in Africa by area, and the 17th largest in the world. According to 2006 estimation the total number of Libyan population is five million and three hundred and twenty-one thousand and three hundred and twenty (5,321,320). The capital, Tripoli, is home to million and sixty-five thousand and four hundred and five (1065405), Benghazi the second city with six hundred and seventy thousand seven hundred and ninety-seven (670797) and the third city is Misratah with five hundred and fifty thousand and nine hundred and thirty-eight (550938) of Libyans people. The total numbers of population in these cities count (2, 287,140) approximately half of Libyan population. The urban consist 85% of the population and the other 15% are rural. Source: General Authority for Information (www.gai.gov.ly)

The health system in Libya

The health service policy in Libya is based on the following tenets and principles:

- Primary health care is guaranteed for all citizens and residents: it aims to care of healthy people and protect them against diseases and ensure good life for all through the preparation and implementing of plans and programmes to do so.
- Developing of treatment services: by providing the elements of its success, such as the medical supply, developed diagnostic facilities and adopting a practical approach of referral system and link it with the developed institutions in the developed world.
- Private Sector: which should be considered as an integral part in the health services system in Libya and support and enhance it is performance.
- Medical supply: which should be focused on providing efficient medicine and of high quality and develop a system of medicine distribution that ensures that all whom need the medicine can get it.

Providing health care and treatment services in Libya are through the following channels:

- Public health facilities in the area of primary care and psychiatric and infectious diseases.

- Hospitals and medical centres which are managed in accordance with the laws governing the conduct of economic activities.
- Medical institutions that belong to public organizations.
- Private clinic and hospitals

Primary health care facilities are committed to provide services to people within the limited geographical area, including the referral system.

Hospitals are committed to provide the following services:

- Out-ward treatment.
- Diagnostic, laboratory, radiology and other diagnostic and therapeutic services.
- Providing of medicines and medical supplies.
- On ward treatment and surgery.
- Providing aids and prostheses

Levels of service delivery

The health services system in Libya consists of three different levels.

Level I:

- Include primary health care which relies on methods and techniques that are practically valid, scientifically sound and socially acceptable. Moreover they should be accessible to all individuals and families in Libyan society. The primary health care is an integral part of overall socio-economic development of Libyan society.
- Primary health care is a first contact for individuals and families with the health system to bring health care to the citizens as possible, as defined by the local and global legislation.

Level II:

This is the level of public hospitals' ward and provides services in the areas of medicine major for people who are referred by primary health care services.

Level III:

Through which it provides specialized medical services and is considered the summit of pyramid in ward, specialized medical services. The cases in this level should be referred from the public and private hospitals, i.e. from the level two services.

Figure shows the levels of the health services in Libya