CHAPTER 7

DISCUSSION OF KEY FINDINGS

7.1   Introduction

This chapter draws together results from chapter four to six relating them to the study aim and research questions and to the previous works discussed earlier in chapter two.   Using the insights gained from the case study, it explores perspective on the issues underlying health information access by medical professionals at KNH and how this new understanding helps to answer the research questions.

Section 7.2 begins by discussing findings on information needs relating the present study to the previous works on information seeking of medical professionals. Results that focus on the question of information sources are discussed in Section 7.3. Section 7.4 discusses the results focusing on availability of ICTs and access to electronic health information resources. The results relating to the question on the impediments to ICT utilization are discussed in Section 7.5. The last research question: 'how can the use of ICTs be enhanced for improved access to relevant health information and knowledge?' is discussed in chapter eight as a proposal and an accomplishment of objective six of the study.

7.2   Information needs and information seeking

Results relating to this theme were presented in chapter four. The information process of physicians in patient care has been described as iterations of inquiries/interventions (history, examination, diagnostic testing, treatment) and

responses to updates of a patient's clinical status and/ or a practitioner's status (Johns & Fortuin, 1988). Parallel to this process is the process by which decisions are made about further enquiries/interventions, for which the practitioner may need to consult external resources (Wilson, 1981).

Drawing on the interview and observation data on the information needs, a seven-fold typology of the kinds of information routinely needed by the medical professionals emerged from the study (see Section 4.3.1). Information needs include questions about the best current scientific evidence available for treatment and diagnosis, as well as factual information available in medical textbooks, journals, electronic databases and other reference materials. Gaps in knowledge can have significant detrimental effects on patient care and can contribute to medical errors including *delays in treatment and diagnosis of the patients.* Information seeking is a conscious effort to acquire information in response to gaps in knowledge. Filling these gaps is an important part of clinical training and lifelong learning. The data demonstrate that the need for problem-oriented information, related to the care and management of patients, was the predominant factor that prompted the medical professionals at KNH to seek information.

The study findings are consistent with other studies on information behaviour of physicians which place emphasis not on the roles that doctors play but on the kinds of information they use or need. Gorman (1995) identified five types of information needed by doctors: patient data (about a specific patient), population statistics (aggregated data about groups or populations of patients,

medical knowledge (generalisable to the care of all patients), and logistical information (for example insurance information), and social influences (information about the expectations and beliefs of other people). The results also accord closely with those of Boissin's (2005) study of French General Practitioners which revealed that they were looking for three kinds of information: diagnosis (to find out the disease); therapeutic information (to treat and cure); medical topics (for keeping up to date and continuing medical education). These are to a large extent the same kinds of information needed by the medical professionals at Kenyatta National Hospital as captured by the seven-fold typology shown on Table 4.4 in Section 4.3.1.

7.3   Information sources and channels used

The study participants felt strongly the need *'to refresh, to update, and keep abreast of current developments'* for better patient care and management. These needs were reportedly being catered for through a wide variety of information sources: professional colleagues, textbooks and journals, the Internet resources, and pharmaceutical representatives. Two other information sources were identified; one respondent mentioned the use of medical records, and one used a personal digital assistant.

The preferences medical professionals have for these sources and how they access them can be conceptualized in terms of information-seeking strategies in which convenience and availability take precedence over other criteria for selecting information sources. They first access the most readily available and convenient source, followed by secondary sources if the problem remains

unresolved. Personal experiences, together with information and consultations from colleagues, were considered more accessible and useful for clinical decision-making than printed or electronic information resources. While simple information needs that arise in clinical settings can be addressed by consulting a colleague; most of the other information needs require more comprehensive or authoritative sources. Observations revealed that printed sources of information were usefully accessed during consultations only in relation to drug prescriptions and related enquiries, which quite often acted as a trigger for information seeking behaviour. Sources used for this purpose included the BNF and MIMS-Africa.

The study findings are consistent with other studies on doctors' use of information in clinical decision-making, which reveal that other professional colleagues dominate as the prime sources of information in uncertain clinical situations (Covell et al., 1985; Tomlin et al., 1999; Cogdill, 2003).

Previous studies have also shown that information seeking by clinicians may be driven by preference for oral over written sources or by cognitive style and self-image as practitioners. Some practitioners see themselves as scientists with a curiosity about research, and others, preferring to focus on patient relationships, make use of information already refereed and summarized by their peers (Cullen, 1997). These considerations may have a considerable impact on the choice of sources of information on the Internet as well as in other formats. Professionals anticipate information needs by organizing and maintaining "personal information collections, defined as subsets of…

information… that individuals build conceptually and physically over time" (Bruce, 2005), including "sources and channels… that can be located again easily." These preferences follow a principle of "least effort" (Zipf, 1949), in which selection of resources (tools) are optimized to meet needs (jobs) in terms of the efforts and cost to maintain and use them. Results from the study therefore confirm that our medical professionals have the same information needs as their counterparts in the developed countries.

In nearly all instances of information seeking and particularly in the Casualty/Emergency department, the first source of information was most often an informal source – specifically another team member. This is not surprising because Casualty/Emergency department is a team environment consisting of medical professionals from many disciplines and each brings their own experience, knowledge and expertise to the department. The over-arching organizational goal for the Casualty department is to move patients through quickly in order to care for as many patients as possible. Solutions to patient management problems are needed urgently. This type of environment leads to the need to deal with questions and issues as they arise in order to keep the process from slowing down. Again, synchronous communication with human sources better supports this need.

As posited by Connelly (1990), the advantage of interacting with colleagues is the possibility of improving the chances of application of the information sought.

> *In practice, physicians seem to respond to the counsel*
> *of their peers and local opinion leaders, and it is*

expected that the pool of available experts will increase with ever-wider availability of network consultations. (Tsafrir and Grinberg, 1998)

In studying the communication behaviours in a hospital setting, Coiera (1998) also emphasized the role of communication technology rather than information technology in supporting information exchange.

The respondents indicated the popularity of printed sources – textbooks and journals in spite of becoming out-of-date quickly. This may be due to the continued importance of basic textbooks in some subject areas in medicine and the fact that books provided immediate access to concise information; and the lack of easily accessible computers with internet access and capable of operating electronic information resources. Doctors without their own consulting rooms at the hospital carried resources around with them. The most frequently used handbooks commonly found in their pockets were the MIMS-Africa and the British National Formulary (BNF). This probably may also reflect the structure of most of the medical training around clinical competence and knowledge, with limited expectations on understanding of current research and policy debates.

Characterization of information needs and information resources use by medical professionals may be helpful on several fronts. First, it can help plan placement of resources to promote their effective use. It has recently been suggested that the way to promote evidence-based medical practice is to promote information management (Slawson and Shaughnessy, 2005). Second, it may help to determine medical professionals training needs

(knowing what questions to ask and what resources to use) in problems of new awareness. A recent systematic review (Choudhry, Fletcher and Soumerai, 2005) suggests that the longer physicians are in practice, the greater their need for quality improvement interventions. Third, it may help medical professionals develop and maintain situational awareness of information as it relates to patient care, practice improvement and professional development. Lastly, it may help determine factors that influence medical professionals to use specific resource types.

In this study the use of library and information services by the medical professionals from the locations outside their place of work, as shown on Table 5.1 in Section 5.2 reflects the lack of investment in library and information infrastructure by Kenyatta National Hospital. During the interviews, respondents made suggestions for the establishment of library and information services with up-to-date books and journal subscriptions:

- Information services: *'library and information system with up-to-date books', 'adequate supply of up-to-date textbooks'*.
- Books available: *'availability of books and journal when I need them.'*
- Accessible computers: *make computers and internet facilities available in all the departments including wards, clinics and consultation rooms.'*
- Journal subscriptions: *'pay for subscription to the relevant e-journals.'*

These points are important because they emphasize the need for the provision of library and information services, which are either inadequate or non-existent for the clinicians; and the importance of adequate funding to

support it. It is quite unfortunate that in most of our institutions, libraries and information services usually take a low priority in institutional and even in national budgets because the decision-makers do not fully understand the roles of libraries, especially in this information age. It also shows that the interests of library and information users are never taken into consideration during the day-to-day planning and operations by the management in our institutions.

The negligence of health information infrastructure and services at KNH could be attributed to the lack of a coherent national information policy that emphasizes the role of library and information services in the promotion of health care delivery. Health administrators are rarely literature-oriented people and many of them can conceive of information support only in form of statistics and data. Their opinion of the value of library-generated information services will necessarily be guarded, given the difficulty to prove, through indicators, the impact of information support on the quality of health care delivery. This cautious attitude is still aggravated by the outdated image of the library held by many health administrators.

To change this state of affairs may require sensitization of value of information. Pressure upon the authorities must be exercised by medical staff themselves, who should voice their information needs and request that action be taken to meet these needs. The Ministry of Health and international organizations, and particularly the World Health Organization, should undertake an education effort among the health administrators and policy

makers, create awareness of the need for clinical decision support system for the health care professionals and the need to promote the use of information in the delivery of high quality medical care.

The involvement of the UON Medical Library in the programmes for information support to the medical professionals at KNH is an absolutely crucial factor. It constitutes substantial resources of medical knowledge within the precincts of KNH and it would obviously be highly preferable, for financial as well as technical reasons, to use existing service systems rather than building an entirely new, parallel infrastructure. The argument would be for 'rationalization'. The obstacles to overcome here are of administrative and policy nature: this means overcoming bureaucratic constraints, convincing the responsible decision makers and the relevant government departments that the achievement of 'Health for All' and the Millennium Development Goals (MDGs) requires the mobilization of all resources, including those outside Kenyatta National Hospital. From a national viewpoint, it makes better economic sense if information resources, which represent a significant financial investment, are shared among all potential beneficiaries rather than restricted to the use of a small number of academicians and medical students.

7.4 Access to and use of electronic health information resources

Delivery of quality healthcare services in developing countries and particularly in Sub-Saharan African countries are known to be hampered by limited resources such as medical equipments, supplies and essential medicines. However, lack of access to reliable and up-to-date information resources

presents a major impediment. The resulting knowledge gap militates against the provision of the best and quality healthcare for patients.

Although this study shows that medical professionals at KNH have much the same need for information - to keep abreast with advances of knowledge in their profession; as that needed by their counterparts in other parts of the world, several key factors that specifically limit access and use of information resources were reported by the respondents. These limitations could be classified in four broad categories: (1) lack of physical access including limited access to the internet and electronic information resources, (2) lack of time and incentives to access information, (3) lack of technological skills and competencies, and (4) lack of general awareness of what is available.

Use of the Internet is slowly increasing as a means of communication and a source of information in this community of healthcare practitioners. Internet can streamline and standardize communications between medical professionals, hospitals, pharmacies, laboratories and patients, to increase the speed and accuracy of information flow. Access to the Internet would also provide the opportunity to register with special interest discussion groups, and to utilize e-mail facilities. This would allow information access, discussion, and information sharing among the healthcare professionals.

Virtually all the participants in this study had used the Internet; they relied on the internet for information because it has a lot to offer. However, they do not have access to the internet facilities at work. KNH authorities have not

provided these facilities to clinical staff in their offices or consulting rooms due to inadequate infrastructure and funding constraints. The results show low use of CD-ROM resources among the participants, this could be because of inadequate computing facilities available to the clinical staff, and there are also a few organizations supplying materials in this format nowadays.

The findings further indicate that the hospital supports a local area network infrastructure, but substantial attention has been focused on Hospital Management Information System (HMIS) in support of administrative, financial and patients' registration functions only. It is not surprising therefore that the majority of the respondents used cyber cafes as the setting to access the Internet. Lack of access to the Internet in the clinical areas may undermine physicians' ready access to up to date information for patient care.

E-mail was the most commonly used internet service and was the main reason why slightly more than a half (22) of the respondents in this study used the internet. This can closely be compared to quantitative studies carried out among the physicians in rural Washington at 60% (Chimoskey & Norris, 1999) and in Vienna, Austria at 60 % (Thompson, 1997). However, it is much lower than 96% among resident physicians in Pennsylvania, United States (Parekh, Nazarian& Lim, 2004). E-mail is a fast and reliable means of communication. It is cheap to use, costing only a few seconds of phone time whether it is sent locally or abroad compared to service mail/postal services in Kenya. The high cost of sending documents through facsimile has further popularized e-mail. Since individuals can scan their documents and send them as attachments

via e-mail, more people tend to use this mode of communication including physicians.

The level of awareness of online health information access initiatives varied and was generally low among the medical professionals at KNH. The majority of the respondents were not familiar with HINARI and AJOL; other described frustrations and problems accessing free full text articles via Medline, which may be because they are not logged into HINARI as KNH has not taken the initiative to join the consortium with other Kenyan libraries in PERI programme. Some stated that even the passwords did not guarantee opening a website. For this reason, majority of the participants expressed preference for an ordinary search using goggle and yahoo search engines and the websites that do not require log-in to access the journals, such as the MEDLINE /Pub Med. MEDLINE/Pub Med database is popular because it is free on the Internet. It has a broad coverage of the biomedical and allied health literature making it an attractive option for many medical professionals including the respondents in this study.

Much of the clinical information used by doctors comes from peers, personal notes on patients or in diagnostic tests. They prefer to seek opinion of experts rather than consult guidelines, manuals or computer aided decision systems (Covell, et al., 1985). For many health professionals, face-to-face communication or other interruptive methods (such as mail or telephone) are the preferred modes of information exchange (Coiera & Tombs, 1998). Many doctors find that mobile phones are a convenient method of communication.

In this study all the participants owned a personal mobile phone. However, most of the respondents used their mobile phone *sparingly* for clinical purposes, citing '*the cost of calling from mobile phone'* as prohibitive. The high tariffs on mobile phone calls in Kenya may be attributed to the fact that only two operators are currently licensed to run the services. With the licensing of Kenya's third mobile cellular operator and the establishment of the wireless mobile technology by Telkom Kenya, tariffs are likely to come down to affordable levels.

It has been established that mobile phone usage is widespread particularly in emergencies and within the general hospital environment. The most common reasons given for their use include emergency clinical matters and personal calls (Myerson and Mitchell, 2003). Mobile phones with SMS applications are increasingly used in interventions to deliver healthcare services. SMS messaging have been identified as a useful communication tool between surgeons with enhanced coordination of patient care, improve efficiency of administrative activities, greater accuracy of messages, and even increased responsiveness to urgent cases (Sherry, 2002).

Medical professionals have also not been able to embrace the use of other mobile devices such as the handheld Personal Digital Assistants (PDAs) for their clinical practices. The results of the study show that only one respondent among the participants used a PDA. These mobile devices are predicted to play an integral part in the delivery of healthcare services and facilitating daily clinical task such as to make patient care more efficient, effective and safer in

allowing doctors to access multiple sources of information at patients' bedsides. The portability of the PDA facilitates information retrieval at the point of patient care.

Studies on perceived impact of PDA use on specific areas of clinical care have reported that when medical doctors used a PDA for patient care, the outcome of the PDA use influenced their decision-making involving drug-related information such as the use of eProcrates Rx, dosages, drug interactions and drug choices (Dee, et al, 2005). Over 50% of the 108 respondents in their study indicated that PDA use had changed patients' treatment; while 16% admitted that using PDA had avoided unnecessary medical tests. Similarly, Carroll and Christakis (2004) surveyed 1185 paediatricians' perceptions of the strength and weakness of PDAs and found that both users and non-users felt that PDA could improve health care by decreasing medical errors.

Personal digital assistants are widely used in developed world, but are relatively a new technology in Africa, and little work has been done to demonstrate their utility as a tool for health care in developing countries. The cost of PDAs may still be too high for the average medical practitioner in Africa. This could account for the low level of awareness and use among the study participants. However, there is a significant potential market for affordable handheld technology in Africa where there is little or inadequate ICT infrastructure and a lack of conventional ICT tools and services such as personal computers. The high uptake of cellular telephones in Kenya and

other African countries is an indication that people in developing countries are willing to embrace the new technologies that prove to be useful and relevant to them.

7.5   Barriers to ICT utilization and access to health information

In the present study, the high use of commercial outlets was not surprising, with internet cyber cafés being the main places used to access the internet by the medical professionals. This reflects the limited investments at KNH in terms of cabling and other ICT infrastructure. In the developing world, particularly in sub-Saharan Africa, lack of computer equipments, and Internet connections, and lack of supporting communication infrastructure, constitute major impediments to digital inclusion. The foremost challenge is therefore to find ways of providing access to computer equipments, the Internet and the supporting infrastructure.   The state of the physical communications infrastructure is quite important for supporting data networking.

The importance of the presence of a political will of using the new technology and the importance of the existence of a legal and regulatory framework to support it have also been emphasized (bridges.org, 2001). It is all about creating the right attitudes for ICTs. A major limiting factor in realizing the full potential of the Internet is the mere reluctance of doctors to use it (Kaplan, 2000). Many doctors show high degree of resistance to change their working and information-seeking behaviour, even if they are mastering the skills of the Internet. They value more the interpersonal contact and prefer to use personal experience and communication with colleagues and other traditional sources

such as textbooks. For some doctors the internet is regarded as a hobby and not a job-related task or routine daily work. Walsham & Sahay, (1999) GIS study in India shows that it is not only important to change structures, but also to pay attention to people's attitudes. The issue of negative attitude can be addressed by targeted educational activities showing the useful applications of the Internet. Understanding more about the information-seeking behaviours of the doctors is crucial to encourage many to use the Internet.

Donald (1999) points out that with information and trade liberalization, there is hope that appropriate health technologies will trickle down to those who need them most at grassroots levels. This, however, may not be the case for many low income countries in developing countries. While the internet is making information and training more accessible to many, low per capita income, low information literacy skills and underdeveloped ICT infrastructures in most of these countries have rendered the potential benefits not forthcoming.

With regard to *ICT skills and competencies,* Majority of the participants reported that they had skills and capabilities to enable them use ICTs; with only four doctors reporting lack of sufficient skills and competence. However, even with the self-reported computer competence, many of the respondents still experienced difficulties and required assistance to access and use information from the internet and other electronic resources effectively. The hospital lacks proper internet facilities and computer equipments; and does not provide the internet services to the clinical staff in their offices or

consulting rooms due to funding constraints. This in itself may undermine the medical professionals' ready access to up to date information for patient care.

These findings also compare favourably with studies done in other countries of similar socioeconomic status. A study carried out in Tanzania indicated that 76% of the investigated doctors had no computers at home, and only 50% felt that they understood the basic terminology and concepts of computing – let alone the internet (Samuel et al., 2004). Even in some European countries like Bulgaria, a similar study found that although 97.5% of the Bulgarian physicians have a positive attitude to information technologies and 86.7% recognize the need for computers in medicine, 84.1% of them do not have the necessary skills and knowledge to use computers in their daily medical practice (Feschieva and Mircheva, 2001).

The most common way for all the medical professionals to acquire ICT skills was by self-directed learning – *'self taught', 'through self initiatives'* and *'hands-on experience'*. This, taken with the widespread reporting of self-directed learning, suggests that the acquisition of ICT skills may be driven chiefly by the requirements of work, or other activities, and is not dependent on attendance at formal courses. This is similar to the conclusion of a study by McGlade (1997) who reported that medical students had the same competency in IT whether or not they had taken an information skills training course, and that their skills reflected the requirements of their work. This being the case, clinical staff may be able to gain at least some degree of

expertise through self-directed learning if provided access to ICT tools and services progressively.

Medical professionals in this study tended to identify their training needs as specific ICT skills rather than areas of wider informatics knowledge. The participants expressed interests in acquiring skills in the use of the internet and searching online information resources. The basic ICT skills, however, are simply the tools with which to manage data and information. Health informatics embraces all aspects of clinical information management including, for example, the use of electronic patient records, patient confidentiality and data protection. It is obvious that the medical practice needs to undergo a radical quality change due to the penetration of information and communication technology in medicine and healthcare delivery services. Knowledge of these issues will be crucial not only for the medical professionals at KNH but also across the country, if Kenya is to meet the Millennium Development Goals (MDG) and achieve the Vision 2030.

7.6   Summary

This chapter discussed results presented in chapter four to six by relating them to the study aims and research questions and to previous research outlined in chapter two. Comparison with other studies (Boissin, 2005; Bryant, 2004; Gorman, 1995) showed similarities in the types of information needed by medical professionals: patient-care/clinical information, pharmacological information, latest approaches to treatment modalities, and current practices in medicine, medico-legal information, clinical trials and case reports.

Clinical/patient care information was viewed as a high priority to ensure that clinical interventions were evidence based.

The study showed that the information needs of the medical professionals were being catered for through a wide variety of sources: personal experiences, professional colleagues, textbooks and journals. Professional colleagues topped the list as their preferred first choice information source. Printed sources of information were however usefully accessed during consultations only in relation to drug prescriptions. Sources used for this purpose included British National Formulary (BNF), MIMS-Africa and The Oxford Textbook of Medicine. Medical professionals however, relied mostly on services from outside due to lack of practice library at Kenyatta National Hospital.

Based on the study findings information gathering habits of most of the medical professionals could be depicted as a two step process:

Step one: *'Foraging'* – when time is available and noting for retrieval what might be needed *'just in case'.*

Step two: Then *'recalling'* accurately the information *'just in time'* during consultation when the patient can benefit.

This is when compared with researchers who *'hunt'* for the answers to their queries from all the data sources with little time constraints from the pressure of patient care. Physicians have little time to pursue information; therefore, information must be readily accessible, concise and up-to-date. Three criteria

are pointed to as being prevalent in choosing a resource: immediacy, reliability, and usability. Consultation with colleagues seems to satisfy these criteria.

The study findings revealed some pronounced barriers to health information access and use including lack of physical access, including limited access to the Internet and electronic information resources, lack of information skills and computer competencies, lack of time and incentives to access information, and lack of general awareness of what is available.