CHAPTER 8

SUMMARY OF MAJOR FINDINGS, CONCLUSIONS AND

RECOMMENDATIONS

8.1   Introduction

This study investigated the availability and use of ICTs in health information access by medical professional at the Kenyatta National Hospital, Kenya. The questions that guided the study were:

1. What kinds of information do medical professionals need for their daily clinical practice?

2. How do medical professionals at Kenyatta National Hospital obtain information to guide their clinical practice?

3. To what extent do the existing health information systems/services meet the information needs of medical professionals at Kenyatta National Hospital?

4. What kinds of ICTs are available to the medical professionals; and to what extent are they utilized in accessing information for clinical work?

5. What are the impediments to ICT utilization by the medical professionals at Kenyatta National Hospital?

6. How can the use of ICTs be enhanced for improved access to relevant information and knowledge for medical professionals?

In this chapter a summary of the major findings are presented followed by a discussion of the conclusions. From the insights gained from the case study and Actor Network Theory, a framework for enhancing increased access to

health information is developed and proposed. Recommendations arising from the study and suggestions for further research are also discussed.

8.2   Summary of major findings

The current environment at KNH is one where medical professionals all require   access to health care information resources.   The study participants admitted facing information needs in the course of their clinical work.   The findings showed that medical professionals at KNH have several responsibilities in line with the hospital's legal mandate – as a national referral hospital; providing both primary and secondary healthcare services and providing teaching facilities. These responsibilities include among others *clinical duties, patient care and management, teaching and clinical research, theatre and intensive care services, ward rounds, radiological diagnosis, dentistry and oral hygiene instructions, prescription and drugs management* and *learning*.

Analysis of the medical professionals' responses and observation data provided a qualitative description of their perceptions of information needs and preferences for information sources. A seven-fold typology of the kinds of information routinely needed by the medical professionals emerged from the study; these are discussed in section 4.3.1. Their information needs included questions about the best current scientific evidence available for treatment and diagnosis and to keep up-to-date with the current developments in their areas of specialization. They are prompted to seek information by needs arising from a combination of professional responsibilities and personal

characteristics. Most of the medical professionals are also administrators and managers of their private practice in their own clinics; therefore majority of their time is spent in their roles of direct services to the patients. The tasks associated with clinical governance and care of patient therefore create the greatest needs for information, mainly about treatment, diagnostic workup, medication, disease progression and other aspects of patient management. Professional updating on current medical practices, clinical questions and decisions as well as delivering and training were also high on the list of reasons for seeking information.

The study findings confirmed that medical professionals had established their own personal information domain – their own routes to information using a cluster of information resources. However, when the medical professionals experienced clinical uncertainty, they preferred to seek information from their professional colleagues. Textbooks and medical journals were the mostly used information sources. There was, however, a substantial preference for electronic searching for information with the top sources of information given as the Internet, e-journals and medical databases such as the Medline. Level of awareness of online health information access initiatives varied and was generally low among the medical professionals at KNH. The majority was not familiar with HINARI and the Africa Journals Online (AJOL) online databases. Initiatives such as the PERI programme of the INASP and HINARI of the World Health Organization support equitable access to and dissemination of information in developing countries. However, there were no efforts made at KNH to harness these free access initiatives developed by the donor agencies

for the benefit of the medical professionals. Consequently, most of them were unaware of them and were not regular users. Google was the leading and the most popular resources used.

The study findings also revealed that both physical and electronic access were the greatest barrier to information access and use. Library and information services were either inadequate or non-existent for the medical professional at KNH. Majority of the medical professionals accessed these resources from locations away from their work place. There was no Internet cafés within the hospital buildings where doctors could access online facilities except at the nearby Post Office and the University of Nairobi Medical School library. Majority of the respondents used commercial cyber cafés to access the Internet. Although the hospital has a local area network infrastructure, substantial attention was mainly focused on administrative and financial functions. Most of the clinical services departments were ill equipped for Internet connectivity.

ICT skills had not caught up with the increasingly technical environment for information access for the medical professionals at KNH. Even with the self-reported computer skills, majority of the respondents still experienced difficulties and required assistance to access and use information from the Internet effectively. Self-taught method was the most commonly used means of acquiring ICT skills and computer competence among the medical professionals. The participants expressed interest in acquiring further

information literacy and ICT skills to a point where they feel confident that they can find and use the information that they need efficiently and effectively.

It was clear from the findings that many critical information needs of medical professionals at KNH were not being met efficiently or at all. Participants identified several limitations in information access and in some cases suggested ways of overcoming some of the limitations. These limitations could be classified as: lack of institutional library and information services, lack of ICT infrastructure, lack of computer equipments and internet facilities, inadequate IT skills, limited financial resources or budget constraints, and lack of general awareness of available information, including problems with locating information that is available.

8.3   Insights gained from Actor Network Theory

The use of ICT and access to electronic health information and knowledge in developing countries such as Kenya can be described as a "process of network formation in which all actors seek to persuade others to become their allies in promoting the acceptance of their own view of the way the problem can best be solved" (Tatnall, 2000). It is a process of translation, where actors in a dynamic negotiation and persuasion mutually define each other in terms of their roles and responsibilities. In this process ICT itself is one of the prominent actors involved in shaping the network.

The use of Actor Network Theory (ANT) extends to provide explanation of how technology is accepted within communities and organizations.

Technology is much a product of social construction as of technical innovation and advancement. Hence its successful adoption and use within an organization or a group will depend on both the technical and social aspects. The social perception of the technology, the prevalence of messages such as 'everybody is using it', and the presence of a critical mass of users will determine its success. As people take a positive view of ICT they begin to use it as part of their daily work practice and routine and they recommend its use to friends and colleagues (Latour, 1987).

In the context of this thesis, ANT is offered not as a definitive explanation for the phenomenon of ICT utilization, but as framework for sense-making - a set of concepts and ideas which provide a sensitizing tool for describing the process of establishment of an electronic health library in order to enhance access to health information for the medical professionals at KNH.

8.3.1 Prescriptions for establishing an e-Health Library at KNH

As described in chapter 2, where ANT was discussed, the creation of an actor-network, also referred to as translation, problematization is the first stage of translation. During this initial stage, the actor(s) initiating the process seek to define the problem and solutions and also establish roles and identities for other actors in the network. As a consequence, the initiators establish themselves as an obligatory passage point (Callon, 1986) for problem solution. Problematization is an indispensable moment as it implies that the problem resolution can only be negotiated through the obligatory point of passage (OPP). The network must be built as a solution to a problem; the

e-Health Library at KNH should be seen as an obligatory passage point as it represents the solution to the problems of access to health information. Therefore, the first element to be enrolled into the network is the 'problem owners'.

8.3.2 Identifying the (actors) stakeholders

The stakeholder groups (actors) for the e-health library must be identified. They include the medical doctors and allied healthcare professionals and Kenyatta National Hospital as the employer, who takes the role of initiator and the 'problem owner'. Other key actors will include: Patients, Healthcare service delivery, Ministry of Health, Ministry of Education, Health information access initiatives (local, national & global), Library and Information Science groups, Professional Associations, University of Nairobi, ICT infrastructure, computer equipments and hardware, organizational and management procedures, the hospital management policy, donors' financial support, and other external influences such as the National ICT policy among others.

For each actor, through interviews with representatives of the groups and analysis of documentation and reflection, interests, attitudes, relationships, roles, power and influence and involvement in the historical context should be examined. Looking at interests involves an examination of the actors' rational and organizational interests. Rational interests concern their logical interests and the objective view they take of the proposed network. Organizational interests concern their political and social interests arising from their roles in the organization.

8.3.3 Building actor-network model

The relationship between actors and local economic and natural resources may also exert an influence on the developing actor network. The importance of the relationships or connections between actors or groups of actors needs to be examined since the strength of these connections may influence enrollment strategies. Texts technical artifacts, people and money circulate within the network; interactions between actors involving these intermediaries should be traced. The complexity of the actor-network can then be assessed. This will have an influence on strategies for aligning the actor-network with the desired outcomes of the e-health/virtual library. Alignment may involve simplifying the actor-network since the more complex the actor-network, the more difficult it is to align (Monteiro and Hanseth, 1996).

ANT suggests the aligning of the interests of actors in a common network to address the long-term users' and organizational needs. This involves the *translation* of those interests into a common interest. Thus the medical professionals' interests must be shown to be linked, and fulfilled by the interests of the social network involving the implementation and use of e-health library. The doctor's interest is *translated* into an interest in promoting the use of the e-library. The *translation* is achieved in the network through common definitions, meanings and *inscriptions* attached to the technology.

8.3.4 Designing inscriptions

Inscriptions which will support the alignment of actors' interests in the network need to be developed, taking into account not only the interests of the

actors, but also the history, culture, politics and previous exposure to technology may have a significant effect on the development of the network through the attitudes and values which have been laid down within the social groups. Inscriptions will include: Health information databases, e-journal and books, clinical practice guidelines, drug information services, links to quality health websites, internet-based interactive and e-mail services etc.
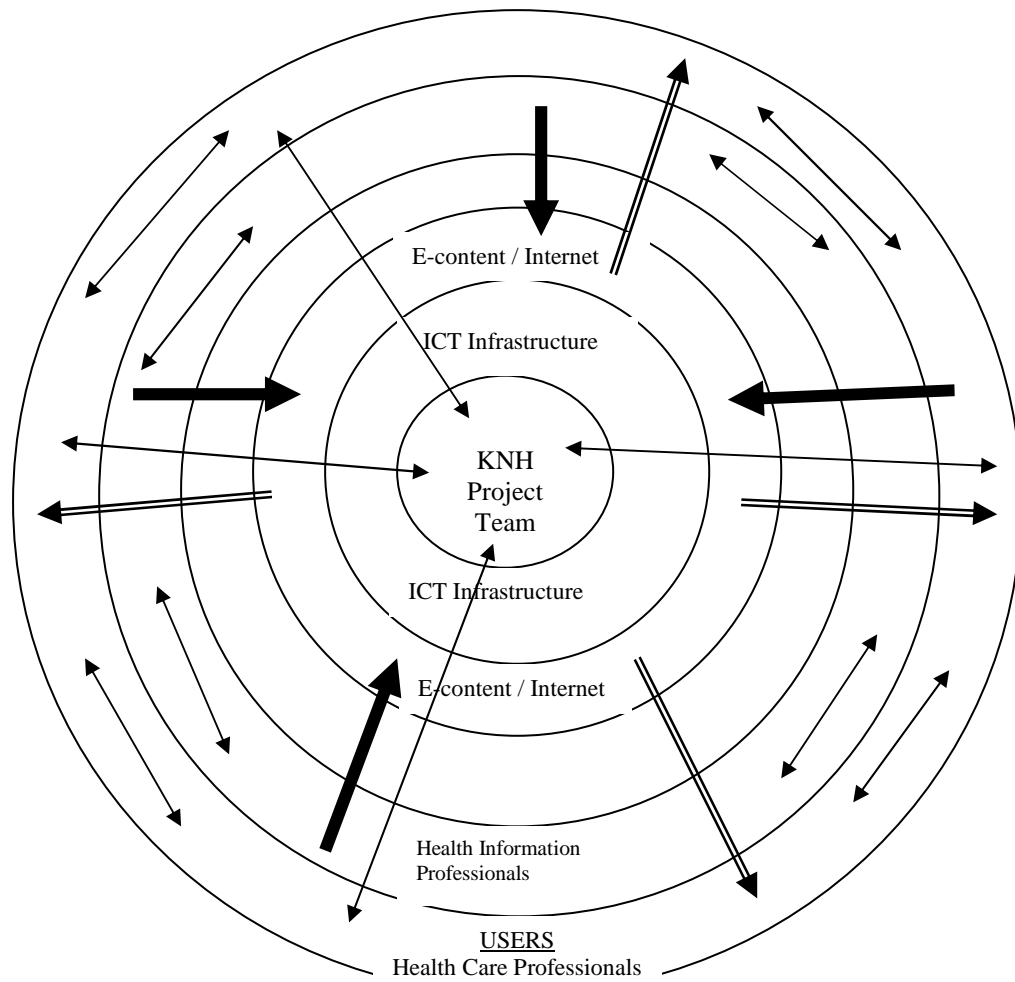
8.3.5 Designing enrolment strategies

In addition to understanding the stakeholders and designing inscriptions and services around the e-library, the establishing of a stable actor network will require good enrolment strategies. This may involve challenging the stakeholders' current assumptions, and opening existing black boxes in order to promote the new technology. Lock-in to the current ways of doing things will act as an inhibitor to the use of e-library and evidence-based practice. Other promoting and inhibiting factors may arise, for example, the slow speed of the Internet; the inadequate availability of e-journals; the attitudes of stakeholders, for example, resistance from opinion leaders such as the consultants and external effects such as government policy and funding. A variety of directions may be explored, arising from interviews and reflections on the information gathered. The aim is to promote lock-in, in which access and use of current evidence-based health information becomes acceptable, has a positive social construction placed on it and becomes embedded as the default means of daily clinical work practice.

The analysis will lead to a list of activities designed to promote the alignment of actor network. This may involve marketing the idea to groups and organizations, training individuals designing diversions around irreversible blocks of resistance whether human or technical, developing strategies for enrolling actors to the network, as well as changing or modifying the technology to promote social acceptance (possibly through simplification or standardization). The entire purpose of this process is to incorporate management strategies into the implementation plan in order to ensure that the technical implementation is accompanied by social acceptance and the embedding of the technology into the social, organizational and human structures.

8.4   E-Health Library: a framework for enhancing access to health information

An e-health library would offer both a rich suite of information resources across a continuum of care, and links to quality-evaluated websites to all healthcare professionals. Such an e-health library would enable enhanced access to health information by sharing knowledge acquired from other countries; as well as improving the communication of communities of practice in the area of health sciences and human development, through the use of the internet, communication services such as interactive distributed databases, online access to journals and e-mails. Figure 7.1 below indicate mechanism for delivery of e-resources for Kenyatta National Hospital.

Figure 8.1: Delivering electronic information resources at KNH

E-content / Internet

ICT Infrastructure

KNH
Project
Team

ICT Infrastructure

E-content / Internet

Health Information
Professionals

USERS
Health Care Professionals

Knowledge exchange / information sharing

Access to e-resources

Local services feeding into e-content

The above diagram shows the KNH project team at the hub of the wheel. Best practice, ideas and information flow from external environment to this core team, which is then disseminated from this point. It will be the work of health information professionals to plan and review its provision. Medical professionals will access the e-library directly; health information professionals will encourage their use; and would also be responsible for:

- Identifying user information needs;

- Raising awareness of available information sources for the users;

- Support and training the hospital staff on how to use sources and search effectively;

- Supporting the specification of resources for specific user segments and providing targeted services for specific staff groups;

- Building local partnerships to optimize services;

- Collaborate in specialist communities that own content models and provide structured information on these topics, which are essential for the users.

The content of the proposed e-health library model will include key health information resources and clinical-decision support tools. For example:

- Health information databases, such as Medline, Cochrane Library etc,

- Full-text electronic journals

- Clinical practice guidelines

- Full text electronic books

- Drug information guides

- Health administration resources

- Health statistics

- Collected and organized local content – formal and informal

- Links to quality evaluated health care websites

Figure 8.2: The case for e-Health Library for KNH
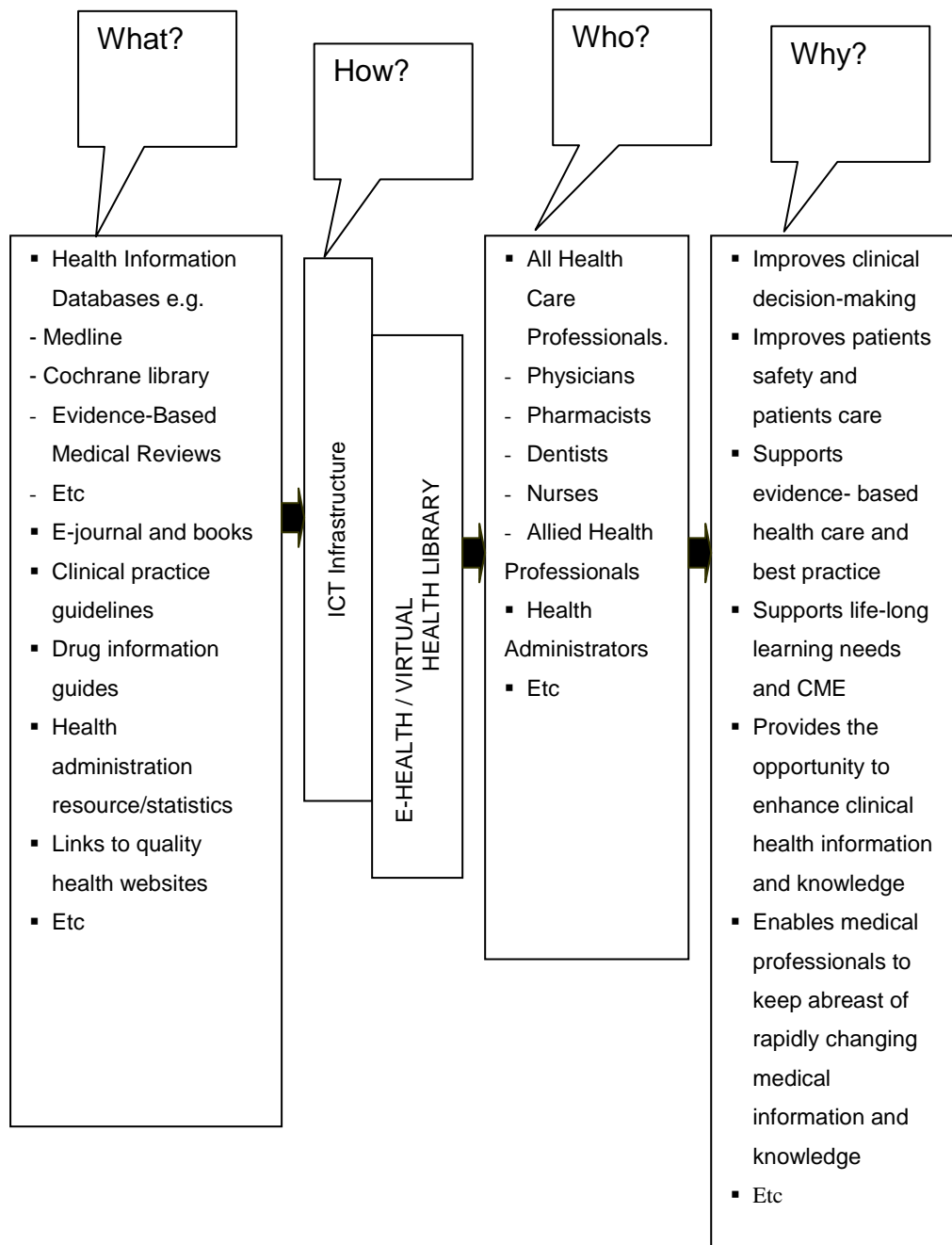
Benefits that can result from the development of an e-health library for the health care professionals can be envisaged:

- Improves the clinical decision-making process;

- Supports the life-long learning needs and continuing professional development of healthcare professionals;

- Fosters innovative and creative alternatives for health care delivery and resource management;

- Improves patient safety and patient care, for example "eighty-eight percent of reporting physicians agreed that information from the library contributed to higher quality care." (Fischer and Reel, 1992);

- Supports evidence-based health care and best practice principles

- Provides a significantly broad range of information resources and opportunity to enhance health providers' clinical/health information knowledge;

- Enables the health care professionals to keep abreast of rapidly changing health information and knowledge;

- Improves health outcomes, and overall population health. For example a study on "Impact of the virtual health sciences library showed … the impact of information … resulted in avoidance of adverse health events." (Richwine & McGowan, 2001).

However, the agenda for the implementation of an e-health library has to take cognizance of the challenges related to the creation of an electronic/virtual Health Library . These challenges relate to:

- Building adequate ICT infrastructure to support the e-health library

- Securing adequate funding for the establishment and sustaining of the project

- Getting the attention of the national planners and especially in relation to securing national counterpart funding for the project

- Suite of information resources must be dynamic vs. static to meet evolving needs, and will need to be evaluated and procured on an ongoing basis to ensure currency

- Considerable on-going training and support will be required for the key players of the project

- Possible negative perception of the necessary change to the existing work practices and arrangements- will need a change management and communication strategy.

This process of bringing ICT closer to the work environment and enhancing access to credible and relevant information for the medical professionals requires tremendous efforts if evidence-based practice is to be a reality. Therefore, it cannot be accomplished without collaboration across projects, stakeholders, funding sources, and even national borders.

The value of the concepts provided by ANT may go beyond the ability to describe technology spread, towards providing a prescriptive tool for encouraging technology uptake. An understanding of the actors and their circulation within the network should enable the development of tailored inscriptions and enrolment strategies that will support the embedding of the

use of electronic information resources in support of clinical decision making among the medical professionals at KNH.

8.5   Conclusions

Information has been critical part of the medical professionals' armament of tools to provide patient care. Utilizing ICTs can offer the healthcare professionals with enhanced access to: key data at all levels from international to local, electronic libraries of evidence, peer reviewed research and practice guidelines, and network of professionals in health and related disciplines. While information access is critical in delivery of quality health care services, there are many problems that are inherent in attempting to meet the information needs of medical professionals at Kenyatta National Hospital. Through a triangulated study of medical professionals, this research has addressed a number of questions related to information needs and helps us better understand current information environment at KNH.

The results of this study underscore the importance of access to information resources in hospital settings. Evidence-based decisions require access to information resources as well as an understanding of how to use them effectively. Results of this study point to the importance of medical professionals' access to resources that can resolve information needs related patient care, prescribing drug therapy, formulating diagnoses, latest approaches to treatment modalities, current practices in medicine. Consistent with previous studies of physicians, consultations with professional colleagues was found to be the most frequently used sources of information, particularly

for issues to do with diagnoses. Other sources included textbooks and journals, the Internet and pharmaceutical representatives.

It cannot be stressed more emphatically that access to current evidence-based health information is critical to supporting safe practice and clinical decision-making at point of care. In addition, access to information regarding new models of care, health and health systems research, critical pathways and best practice are crucial to enabling the e-health. The solution to this untenable situation at KNH is an e-Health library as it has been proposed. This would offer a rich suite of health information resources to medical professional across all specialties. Considering the renewed concern with the quality of hospital care, efforts to better understand and meet the clinical information needs of the medical professionals may contribute to improved patient care. Such efforts could help extend and solidify the hospital library and information services' support base. Medical professionals should also be more vigilant by subscribing to relevant discussion groups and intensifying Internet browsing as a way of getting awareness of all the available resources. It is only then that e-resources and especially the open access sources can effectively be utilized.

Access to quality information also requires serious training in information literacy and ICT skills. This goes further than just throwing a few terms to Google or Pub Med. For example to get high quality evidence one needs to develop complex strategies for complex databases such as Medline, Embase and the Cochrane Library Database of Systematic Reviews. Whilst medical

professionals can search for themselves they usually develop very simplistic strategies and have no idea of structured thesaurus based searches. There is a need for improvement of information literacy and ICT skills. What this requires is a change of mindset in order to link up with the demands of the environment. Extensive research will be required to deepen our understanding of the information needs and information behaviour of the target group.

8.6   Recommendations

Based upon the findings and conclusions of the study, the following recommendations were made as suggestions to the government and specifically to Kenyatta National Hospital, for enhancing increased access to health information and knowledge for the healthcare professionals in Kenya.

8.6.1   Establishment of library and information services

To obtain the required clinical and social practice information, library and information services should be available to all healthcare professionals at KNH.

There is an expanding body of evidence from existing systematic reviews that information provided by a library and information service can influence patient care outcomes in various ways and assessment of the impact at a local level is feasible.

In addition, there is evidence that library services can lead to time savings for healthcare professionals and thus, the cost savings and healthcare benefits (O'Connor, 2002; Winning & Beverley, 2003; Wagner & Byrd, 2004). Library and information services will also provide the opportunity to enhance health providers' clinical/health information knowledge and enabling them to keep abreast of rapidly changing health information environment. The library content should demonstrate resources for all areas of services. Books and journal subscriptions should encompass the multi-professional needs of all KNH staff. A framework for establishment of an e-health library for Kenyatta National Hospital has been proposed in Section 8.4 that would offer a rich suite of health information resources to medical professionals across all specialties.

8.6.2 Appointment of health information professionals

To utilize the library resources and services effectively, the role of information professionals will be crucial. Health information professionals can play a key role in the education of health care professionals in two areas – that of training in information skills, and also in promoting an evidence-based culture. Evidence-based healthcare is the emerging discipline that brings the best evidence from clinical and healthcare research to the bedside, to the surgery or clinic, and to the community. Whether seeking information about diagnosis, prognosis or therapy, the practice of evidence-based healthcare starts with converting these information needs into answerable questions and tracking down the best evidence with which to answer them.   The most important requirement in this regard will therefore be the appointment of a clinical

librarian who would also do more to lobby for and proactively advocate tools for modern information management as well as point out to the managers and policy makers the importance of ICT as a tool for enhancing access and dissemination of information for healthcare professionals.

8.6.3. Formulation of ICT strategies and policy

For ICT to provide medical professionals and other health information users with reliable, up to date and timely information, it must be understood as an essential tool for the development of an efficient health service delivery. There is need to support and promote ICT as a strategy to improve access to credible and relevant health information.   Absence of written strategies or policy has been shown to give rise to many undesirable effects including duplications of efforts, as well as expenditures that cannot readily be justifiable. The importance of a strategic ICT policy is realized when one considers the potential of ICTs whether long or short term. With regard to KNH, this relates specifically to the following major areas derived in part from United Nations Economic Commission for Africa's (2001) review of potential of ICTs in healthcare in Africa:

- Improving access to relevant information and knowledge for the healthcare professionals;
- Strengthening the basis for decision-making by both healthcare professionals and health administrators as a result of information provided;

- Transferring diagnostic information from various treatment areas such as specialized clinics, consultation rooms, wards, and laboratory to the respective medical records department so that it can be collated for better patient care and management;

- Underpinning public education campaigns to promote health behaviour in critical care areas such as HIV/AIDS;

- Promoting information exchange among healthcare professionals and researchers; and

- Enhancing the effectiveness of the hospital.

To realize these potentials policy framework must be formulated that will encourage and promote the use of ICTs as tools for health information access and dissemination. The policies must address the long term users' and organizational needs; they should also be flexible and constantly reviewed in keeping with technological trends.

However, it must be realized that the process of ICT adoption is a complex one and requires synchrony and success in multiple factors and stages. A model of successful adoption and use should include an assessment of these environmental factors: internal or external urgency to change; availability of appropriate products; and awareness of technology options. In addition, the model should encompass these key aspects:

- identification of leadership commitment and vision;

- development of functional and technical requirements that meet the goals desired;

- assessment and analysis of organizational readiness for change – cultural, leadership, training, competency, incentives, core project team; and

- assessment and analysis of technical readiness for change – infrastructure and set-up; implementation planning; workflow redesign; training; installation; measurement and feedback of results; continuous improvement and integration.

It is also recommended to the hospital management that communications and change management strategies as well as support be developed in order to perform well at all aspects of ICT adoption and use at KNH. While the immediate returns on investments in ICTs may not be readily apparent to the hard-pressed hospital administration concerned with squeezing the most out of limited resources, the long-term potential of proactive strategies for ICT is considerable.

8.6.4. Provision and improvement of ICT infrastructure

There is need for those administrators responsible for decision making in the management and planning of KNH to enhance the technological infrastructure on which diffusion and use of ICTs can take place. In the case examined in this study, the lack of an adequate ICT infrastructure appears to be the principle reason for hindering access to online health information resources, and is clearly a more pressing problem than a lack of available information.

It is suggested that KNH should first utilize the internally available hardware tools and services to enhance its infrastructural base. For example, since it operates a LAN and connectivity already exists in administrative departments, what is then required is to network these departments to other units and key clinical areas in the hospital as a first step in improving access and use of ICTs among the clinical staff.   There is also need to upgrade the existing cable network to a more faster and reliable fiber optic cable and to subscribe to broadband width access in order to enhance access to the internet and delivery of electronic information services.

8.6.5. ICT skills development and training

Building ICT skills is an important component of any ICT intervention because new skills are required for operating the computers, browsing the internet and making use of various communication tools such as e-mail, 'chat rooms', video conferencing etc. Providers and users need continuing education and training to learn ICT and keep up with new developments in hardware, software and services. Investment in human capacity is essential in ICT initiatives.

It is therefore recommended that KNH management should assume a leading role in building ICT skills among the healthcare professionals. The hospital's ICT strategies and policy need to address the provision of basic literacy and the creation of educational and training materials that are suited to each professional group of employee – different groups will require different levels and types of skills. Basic training and continuing professional development

should be tailored accordingly. The current prevailing formula of 'training workshops' need to be reviewed and compared with other methods of skills development, including learning through sharing of experience and networking, learning 'on the job', self-directed learning, and ICT-enabled distance learning.

Furthermore, ICT skills development and training for the medical professionals should be seen as more than just a stop-gap measure, but also as vital tools needed for the promotion of evidence-based culture, which is essential to improving the quality of medical care. Since KNH is a stakeholder, it should do more to lobby for some reforms in the curricula of the medical schools to introduce the medical informatics, and then the doctors will be much comfortable with the use of ICTs and the Internet at an earlier stage of training. We believe that implementing a formal computer literacy course with stated objectives and measurable outcomes for the undergraduate medical students is necessary to install a minimum level of competence.

8.6.6. Involvement of all the actors/stakeholders

The picture that emerged from the case study organization was one which indicated that availability of ICT alone will not make KNH achieve its strategic vision of being a regional centre of excellence in the provision of innovative and specialized healthcare unless it is accompanied by the right mix of changes in attitudes, the development of ICT infrastructure, and the building of capacity in ICT skills for use and maintenance of equipments.

The close involvement of all the employees in planning, implementation and promotion of applications and services is essential. It must never be assumed that there are groups of employees whose views do not matter, even those who do not seem to have the requisite expertise to contribute to ICT adoption process. It is especially critical to engage the lower cadre in the decision making process as much as the gate-keepers (middle level management) since those are the ones engaged in the day to day management and maintenance of the hospital systems.

Because of the concerns and the significant contributions by the donor agencies in improving access to healthcare information in developing countries; it is recommended that KNH management, the Ministry of Health planners and other stakeholders to increase their contributions in this area so that the medical professionals at KNH are connected to the internet for easy communication and sharing of relevant health information. It is suggested that organizations concerned about healthcare professionals' access to information should consider joining forces to sponsor further research to evaluate emerging information initiatives, fund collaborative research projects, and encourage small scale trials of some new systems for information access based on the proposed e-Health Library model (Section8.4), while at the same time fostering incremental changes in terms of increasing access to information for the medical professionals; this is primarily the responsibilities of KNH management.

8.6.7. Allocation of adequate financial resources

Harnessing of the potentials of the internet and ICTs in general goes hand in hand with improvement of technological infrastructure, skills development and training, and sensitization for the sponsoring organization. Adequate budgetary allocation must be provided for the purchase of appropriate hardware and software and other accessories; costs of installation, support and maintenance. KNH should also develop cost models that will sustain investment in e-resources in a way that will even accessibility of information and e-journals across all medical specialities.

It should also be realized that widespread adoption and use of ICTs with require technical skills to develop applications, support and maintenance of ICT equipment and systems. In order to build and retain human capacity there is need to build a conducive working environment not only for organizational, but also professional groups and individual benefits. Conducive environment also implies better workers' benefits, incentives and work procedures created by the involved actors in response to performing their responsibilities.

8.7 Suggestions for further research

The issues of information access and use are a complex phenomenon; further studies require a sound methodological approach that is capable of enhancing our understanding of the phenomenon studied. This study reveals scope for further work on a number of other issues too. For instance, researchers could select from the key findings of this study, one or more subcategories and their

properties for in-depth research in a particular organizational setting to be able to ascertain the issues of information access and use.

Determinants of information seeking: studies have demonstrated consistently that a number of variables (such as age, education, gender etc) affect the determination of selected information sources by information seekers. The deeper understanding of the behavioural background to the effect of variables as a determinant of information seeking would be a valuable contribution to the communication process of the health care professionals.

Hospitals are complex, information-rich environments in which people need to collaborate to provide appropriate patient care, with patient care teams at the core of the work. The collaborative environment in a hospital setting would provide an ideal environment in which to gain a deeper understanding of the collaborative nature of information seeking practices and processes of teams. It might also be useful to undertake further work that addresses the information needs of nurses and other allied health care workers. Furthermore, issues of constraints to information access and use, which emerged inductively from this study, should be investigated further to generate more suggestions to practical solutions to this problem. Future lines of inquiry could also address training issues, such as, what structure should ICT training take? How can ICT training be made effective?

Current changes in government policy present exceptional opportunities for information professionals to contribute to the delivery of quality health care by

emphasizing the centrality of high-quality information to the achievement of the goals of the health services. Conducting relevant research forms an integral part of the contribution that information professionals can make. Imaginative approaches will be required to deduce how best health information professionals may place their expertise at the service of health care practitioners.