CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter discusses the research design and the methodology adopted. All research is based on some underlying assumptions or beliefs about what constitutes ‘valid’ research, what the ‘underlying nature of phenomena’ is and which research methods are appropriate. The chapter begins with the discussion on qualitative research design adopted by the study including the underlying interpretive philosophical assumptions. Details about the choice of research setting and case study strategy as the research method are elaborated. Finally, the chapter presents details of the data collection techniques and the mode of analysis.

3.2 Research Framework

In seeking a framework for the research, it is necessary to consider the reasons why researchers theorize. Proposed reasons include theories as being the first step in liberation from power and oppression (Habermas 1973), that is, part of a political process (Marshall 2001), for the systematic examination and the creation of knowledge (Calhoun 1995), and to be able to explain and predict (Strauss and Corbin 1998). The term “theory” has been used in the sense of providing a general explanation of data and observation. It has been proposed that a theory has three characteristics: generality, accuracy and simplicity, but not all at the same time (Weick 1984). In practice,

it is necessary to concentrate on any two of these. But the question arises as to which of these should be sacrificed.

If generality is seen as being less important than accuracy or simplicity, the result may be a theory that is restricted in its application, that is, it can be applicable to limited range of circumstances. General and simple theories may take on the characteristics of describing overall characteristics without saying anything about particular projects, which is, lacking predictive power for particular projects. On the other hand, general and accurate theories are characterized as requiring complexity, a feature that may deter application. One possible compromise is to undertake a process of refinement, focusing on different aspects of the theory at different stages of theory development:

> *I take the initial general simple explanation and make it more accurate, which necessitates further qualification, differentiation and specification of boundary conditions – all of which involve greater complexity* (Weick 1984 p.117).

This approach to theory development cast the theory as a somewhat flexible thing: something that changes its form as it is developed. If this view is adopted, then it follows that a theory cannot ever be considered to be "correct", rather it is always in a state of change, hopefully changing towards a theory that has increasing predictive power. This view of theory development is in line with the idea of conceptual laws (Schwartz and Jacobs 1979). In this view, conceptual theories are used as explanatory framework during attempts by the researcher to discover where the boundaries of the theory require revision.

Theory has several roles in research, including: to guide the selection of data to be collected and to act as a unifier in analysis (Sawyer 2001), to enable new and different types of questions to be asked (Calhoun 1995), to codify understanding in abstract terms (Markus 1997), to generate general principles (Weick 1984) and as a basis for informing practice (Benbasat and Zmud 1999). A common, though generally implicit theme, is that theory is developed in order to, in some way and at some time, affect what happens in the world, and it is this theme that forms the basis of the framework used to select the methodological approach used in this study as discussed in the sections that follow.

3.3 Choice of research strategy

The purpose of the study is to investigate the issues underlying access to health information and use of information and communication technologies by medical professionals in Kenya. It is exploratory in nature as we seek new insights, ask questions and generate ideas for future research.

The various approaches to research in the field of information systems are summarized by Galliers (1992) in table form with their key features, strength and weaknesses. Remenyi and Williams (1996) examine ‘the nature of research: qualitative or quantitative, narrative or paradigmatic’ and their paper stresses the relevance of qualitative research in information systems and affirms that ‘frequently quantitative evidence is neither more precise nor robust than qualitative evidence’. Remenyi et al. (1997) further consider that

‘human behaviour in particular is about much more than rationality. It is about feelings and about purposes and needs and values’.

Acknowledging the social character of the research and the phenomena under study, this thesis mainly adopts qualitative research methods. According to Creswell (2003) qualitative research methodology enables the researcher to:

- Be interested in meaning – how people make sense of their lives, experiences, and their structures of the world;
- Be the primary tool for data collection and analysis – data are mediated through this human instrument, rather than through inventories, questionnaires, or machines;
- Be involved in the fieldwork – the researcher physically goes to the people, setting, site, or institution to observe or record behaviour in its natural setting;
- Be more interested in the process, meaning, and understanding gained through words or pictures rather than outcomes or products;
- Build hypotheses and articulate expectations, concepts and theories from details gathered.

Qualitative research method (as opposed to quantitative approach) was adopted because it is widely accepted within the information systems research community as being able to provide insights into information systems and services phenomena (Myers and Avison 2002; Walsham 1993, 1995).

Qualitative methods lead themselves particularly well to exploration, discovery and inductive logic. Consequently, an inductive approach, whereby 'theories about what is happening in a setting are grounded in direct program experience, rather than imposed on the setting a priori through hypotheses or deductive construction' (Patton 1990) was taken to data analysis in order to make sense of the situation, develop an explanation of events and establish theories based on the observed phenomena, instead of looking for data to support or deny certain assumptions, questions or hypotheses (Gorman and Clayton 1997).

3.4 Qualitative Research Design

Creswell (1998) defines qualitative research as "an enquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem". The phenomenon investigated in this research was human behaviour. As pointed out by Fidel (1993), the purpose of qualitative research is "to describe how people behave and understand why they behave the way they do." Fidel also emphasized that qualitative research seeks to understand the phenomenon as respondents see it. Furthermore, the researcher assumed that the context plays an important role in understanding the issues surrounding information access and utilization of ICTs, and context is best studied using qualitative or naturalistic approach. Lincoln and Guba (1985) suggested that:

> *"… inquiry must be carried out in a natural setting because the phenomena of study, whatever they maybe – physical, biological, social, psychological – take their meaning as much from their contexts as they do from themselves" (p. 189).*

Inductive reasoning is involved where the researcher seeks to interpret or understand the actors' perspectives to reach a holistic understanding of the problem. The researcher's role is one of active participation as the researcher is the primary instrument for data collection (Tesch 1990, Creswell 2003).

In this research a qualitative paradigm was therefore consistently adopted based on the assumptions that our knowledge of reality is socially constructed. Thus, the approach is to gain understanding of the phenomena through the meanings people assign to them by studying one organization in-depth, rather than a survey technique across multiple organizations. Audet and Amboise (2001) also suggest that a qualitative research design is preferred when the main aim of a particular study is to enhance the understanding of a phenomenon within its embedded context.

Qualitative approach is multi-method in focus, involving interpretive and naturalistic approach to its subject matter (Denzin and Lincoln 1994). Mouton (1996) terms this as the 'triangulatory engine' of qualitative study. Triangulation in this sense refers to the fact that the researcher employs multiple research methods and perspectives to study a given phenomenon in order to determine a common result. In this study data was gathered through interviews with informants, observation of work place and practices, and review of documentary sources; the perspectives of many authors were also considered.

Wainwright (1997) views qualitative research as an endeavour to acquire an in-depth understanding of the interpretations and definitions of the situations presented by the respondents, rather than to produce a ‘measurement’ of their behaviour. This research therefore avoided any attempts at quantitative analysis. Wainwright (ibid) further points out that no consensus has yet been reached with regard to determining the parameters of qualitative research approach. Some researchers view this ambiguity as a source of innovation that gives the latitude to devise a research process that will meet the specific needs and objectives of a particular study. During the course of this study, qualitative research design enabled the researcher to formulate the research strategy that met the specific needs of the research. This study constitutes a first attempt to understand and research on the use of ICT and access to electronic information resources by medical professionals in Kenya.

Within the ambit of this study, the motivation for using qualitative as opposed to quantitative research methods stems from the belief that unlike the natural world, people can talk (Myers 1997). The study approach follows Morse (1994) with the research strategy based not on conscious, prior consideration of philosophical question, but on the study purpose, research questions and the skills and resources available.

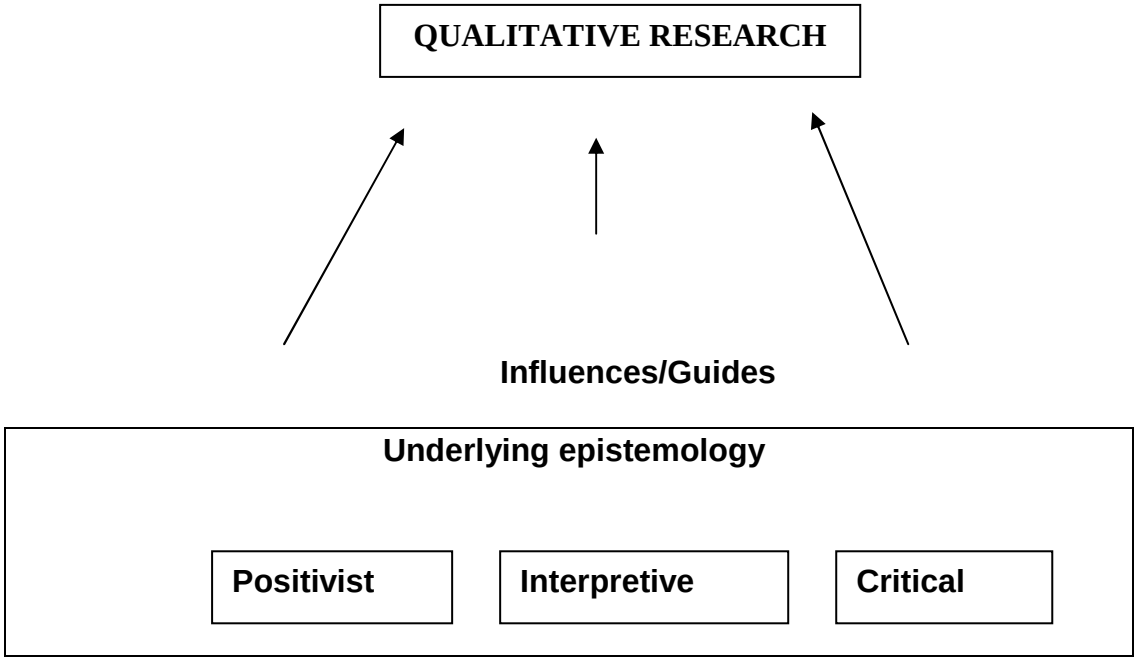
3.5 Philosophical Assumptions of Qualitative Research

Because of the varied ways of distinguishing research methods and the usage of different terms, it is important therefore for researchers to have clear “assumptions about what constitutes ‘varied’ research and which research

methods are appropriate" (Myers 1997; Klein and Myers 1999). For example, the word qualitative is not a synonym for interpretive. Qualitative research may or may not be interpretive, depending upon the underlying philosophical assumptions, the underlying epistemology of the researcher (Myers 1997; Klein and Myers 1999). It is essential for qualitative researchers to be aware of the influence of philosophy on strategies of research. Much has been written regarding the ways in which philosophical positions feed through to influence approaches to qualitative research. Based on philosophical assumptions adopted, qualitative research can be classified as *positivist, interpretive or critical* (Orlikowski and Baroudi 1991); this is illustrated in the Figure 3.1 below. Although research epistemologies in each categorization scheme may be philosophically distinct, these distinctions are not always so clear cut in the practice of social research. The choice of a specific qualitative method is independent of the underlying epistemology (Myers 1997).

In the present study the issues underlying health information access and the dynamics of ICT utilization by medical professionals are examined and analyzed within an interpretive paradigm.

Figure 3.1: Underlying philosophical assumptions



3.5.1 Positivist Research

A research project can be considered positivist if there is evidence of formal propositions, quantifiable measures of variables, hypotheses testing, and the drawing of inferences concerning the phenomena from a representative sample to a stated population (Orliskowski and Baroudi 1991). Positivist approaches assume that the relationship between social reality and humans is independent, objective of the cause-and-effect type. This approach has, however been criticized in the literature of IS for its treatment of organizational reality, which is regarded as complex and not easily amendable to statistical deduction. It is also regarded as being too deeply rooted in functionalism and too concerned with causal analysis at the expense of getting close to the phenomena being studied (Gallier 1991). Examples of qualitative research

done from the positivist philosophical viewpoint can be found in Benbasat et al (1987) and Yin (2002) works on case study research.

3.5.2 Interpretive Research

The epistemological stance on interpretive approaches is that knowledge of reality is gained only through social constructions such as language, consciousness and shared meanings. In an organizational context, this reality is socially embedded in the way people interact with each other in everyday life. As Jonsson (1991) writes, “people act on their subjective interpretation of the world they perceive” and “it can be only interpreted”. The researcher’s role as an interpretivist is on attempting the difficult task of assessing other peoples’ interpretations, filtering them through their own conceptual apparatus, and feeding a version of the events back to the informants (Walsham 1995).

In an interpretive research there are no predefined dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges (Kaplan and Maxwell 1994). Those who espouse the interpretive approach, claim that social phenomena must be understood in the social contexts in which they are constructed and reproduced through their activities. In other words, the understanding of social action must include the meaning that social actors give to their deeds (performance/actions). Further the advocates of the interpretive paradigm consider that the social reality is constructed as a result of intentional actions (Burrell and Morgan 1979). In IS research, the interpretive approaches are

‘aimed at producing an understanding of the context of information systems and services and the process whereby the information system influences and is influenced by the context’ (Walsham 1993 p.4-5). In line with the interpretive approach, the case study presented in this research “assume that people create and associate their own subjective and inter-subjective meanings as they interact with the world around them” (Orliskowski and Baroudi 1991). More specifically the research recognizes that the issue of information access and utilization of ICT in developing countries presents a complex social-economic and cultural context.

The philosophical base of interpretive research is hermeneutics and phenomenology (Boland 1985). Interpretive approaches give the research greater scope to address issues of influence and impact, and to ask questions such as ‘why’ and ‘how’ particular technological trajectories are created (Boland 1985, 1991; Orliskowski and Baroudi 1991; Deetz 1996). Examples of an interpretive approach to qualitative research include the work of Orliskowski (1991) and Walsham (1993).

As a way of improving the quality of research conducted from the interpretive perspective, Klein and Myers (1999) proposed a set of principles based on the hermeneutic orientation. The set of principles are as follows: (1) the hermeneutic circle, (2) contextualization, (3) interaction between the research and the subject, (4) abstraction and generalization, (5) dialogical reasoning, (6) multiple interpretations, and (7) suspicion. They go further to show us how these principles are interrelated – they consider that a researcher decides

what relevant context(s) should be explored - Principle 2 is in use in this case. When it comes to how the data are going to be created in relation to the subjects, Principle 3 plays its role. In deciding which theories or concepts and which research will be abstracted, it is principle 4 that is being used. When researcher's own intellectual history is an issue, Principle 5 is in use. Different versions of interpretations may come into play if they require the researcher to examine the influences of the social context and document the multiple views of 'stories'; the use of Principle 6 is advisable. Finally when the aspects of reality are presented in order to formulate research questions critically, Principle 7 is in use. It is clear that it is not possible to describe all aspects of the context. The researcher has to decide what to say depending on the audience and story that he/she wants to tell.

Klein and Myers (ibid) recommend that researchers must work out for themselves 'how' and 'which' principle may be applied in any particular situation. They also believe that this set of principles may not be used mechanically, since the importance and relevance of each principle is partly derived from the manner in which the others are applied to the collection and interpretation of the field material. If this set of seven principles is used, the research work can become more plausible and convincing to its target audience. Hence the main aim of this set of principle is to improve the plausibility and cogency of the research.

3.5.3 Critical Research

Information Systems research may be categorized as critical if its main objective is seen as being one of social critique, whereby the restrictive and alienating conditions of status quo are brought to light (Klein and Myers 1999). Its focus is on the opposition, conflicts and contradictions in contemporary society, and seeks to be emancipatory. Critical theorists assume that the people can consciously act to change their social and economic conditions. They also assume that the social reality is historically constituted and that it is produced and reproduced by people. Examples of critical research include Ngwenyama and Lee (1997) and Hirschheim and Klein (1994) work.

3.6 Case Study Strategy

According to Yin, (1989 p.23) *"A case study is an empirical inquiry that: investigates a contemporary phenomenon within its real life context; when the boundaries between phenomenon and context are not clearly evident; and multiple sources of evidence are used"*. Case studies are seen as 'appropriate where investigators either desire or are forced by circumstances to (a) define research topics broadly rather than narrowly, (b) cover contextual and complex conditions and not just isolated variables, and (c) rely on multiple and not singular sources of evidence' (Yin, 1994).

The case study approach is a widely accepted research strategy in the field of IS. According to Walsham (1993), case studies provide the main vehicles for research in the interpretive tradition. The case study strategy has been argued to be particularly useful for practice-based problems where the

experience of the actors is important and the context of action is critical (Lee 1989; Galliers 1991).

Pare' and Elam (1997) argue that case study research strategy makes the capture and understanding of the context possible and can be used to achieve a variety of research aims using diverse data collection and analysis methods. Montealegre (1995) indicates that case studies (in particular, in-depth case studies) permit a comprehensive approach to the historical and social analysis of complex phenomena. The interpretive researcher attempts to derive his or her constructs from the field by an in-depth examination of exposure to the phenomenon of interest. Through this approach categories and themes emerge that hopefully are closely linked to the experiences of the relevant study participants (Orlikowski and Baroudi 1991).

Case study research strategy has been subjected to criticism on the grounds of non-representativeness, lack of statistical generalizability and especially the value of the study of single events or cases. Moreover, the richness and the complexity of the data collected means that the data is often open to difficult interpretations and potential 'researcher bias' (Conford and Smithson 1996). However, ardent supporters of this approach make a strong case for it. Gorman and Clayton (1997) take the view that:

> *Concentrating on a single site or event is in no way inferior to more complex technique, for it requires a depth of investigation that is both rigorous and thorough; single-site case study is not synonymous with superficiality.*

Bassey (1981) is of the view that:

> *An important criterion for judging the merit of a case study is the extension to which the details are sufficient and appropriate for an individual working in a similar situation to relate his decision making to that described in the case study. The reliability of a case study is more important than its generalizability.*

Walsham (1993) argues that the validity of the case study approach derived from an interpretive epistemological stance is based on the “plausibility and cogency of the logical reasoning applied in describing and presenting the results from the cases and in drawing conclusions from them”.

Similarly, Yin (1994) addresses this often cited limitation of the case study approach and provides a solution arguing that "case studies like experiments are generalisable to theoretical propositions and not populations or universe. In a case study like experiment, the investigator’s goal is to expand and generalize (analytical generalizations) and not to enumerate frequencies (statistical generalization).” Therefore, if conducted properly using the proper case study protocol their theoretical propositions may be generalized without having to conduct investigations in several organizations, provided the degree of inter-organizational differences is not very great.

In addition, the case study approach allows for ‘thick descriptions’ of the phenomena under study (Yin, 1994). Such ‘thick description’ gives the researcher access to subtleties of changing and multiple interpretations, which would have been lost in quantitative or experimental strategies (Yin, 1994). In studying events in their natural setting, the case study makes use of

multiple methods of data collection such as interviews, observations, documentary sources and archival records.

Given the interpretive stance adopted in this research and the nature of research questions, the complexities of ICT utilization and information access by health care professionals in resource-poor setting such as Kenya cannot be examined holistically by placing clear and predefined boundaries. The process involves multiple actors often with heterogeneous interests at various levels of the health institution. It is believed that the case study approach is the appropriate research strategy for this study. The same research questions could have been approached using surveys designed to examine the context of information seeking by the medical professional as well as the availability and utilization of ICT tools and services in their work places. However, this might not have revealed in details their unique experiences and the layers of factors influencing access and use of health information.

The approach was particularly appropriate for this study as it enabled the researcher to identify various interactive processes at work in the context of medical professional's information seeking, information access which would probably not have been revealed in a survey. And as Hughes observed in his exploration of ethnography in health research, case study offers 'a powerful learning modality that more vividly and sustainedly engages human empathy and, through that, better imprints knowledge than does an abstractly enunciated generalization' (Hughes,1992). For the purposes of this study, it

was judged that such strength outweighed the limitations upon generalizability inherent in the selection of a small sample of informants.

The study used the grounded theory (Glaser & Strauss, 1967; Strauss & Corbin, 1990) approach to data analysis, where what was relevant to the phenomenon under investigation emerged from the data. It was not based on existent theories; rather it aimed to discover the salient characteristics of the phenomenon through inductive analysis of data gathered in the field. The choice of both case study strategy and grounded theory as a method of data analysis were combined and were appropriate for several reasons:

- there is minimal research on this topic;
- this project was studying a process and how people respond to it;
- the study focuses on elements such as context, strategies and consequences;
- the context-based nature of the process.

Because there is no empirical research on information access among the medical professionals in Kenya, grounded theory approach allowed the researcher to explore the phenomenon without a set framework and instead to let the issues emerge. Second, both case study and grounded theory are applied in the study of a phenomenon when it is important for the researcher to study peoples' interactions, actions and engagements in the process (Creswell, 1998). Case study also assumes that the context is important for understanding the phenomenon. The main reason for combining both approaches was that grounded theory allowed for a detailed analysis of the

data and an inductive approach while case study strategy allowed for a focus on context and a bounded system.

Beyond the attempt to avoid prior commitment to any theoretical model, Yin (1989) indicates a second condition that is essential to qualitative research: *"the use of close-up, detailed observation of the natural world by the investigator"* (p.25). This study also satisfied this condition as it aimed to gain a deep understanding of the phenomenon by taking a look in naturally occurring phenomenon of information access and use of ICT in a health care setting.

Although the present study used the grounded theory principles and methodological procedures, its purpose was not to generate a theory. It aimed to gain further understanding of a phenomenon in a particular setting. The study is better qualified as a qualitative/ naturalistic inquiry where methods for data analysis were borrowed from the grounded theory.

3.7 Researcher's Perspective

By employing an interpretive or constructivist paradigm in this study, the background of the researcher is deemed relevant so that explicit and implicit ideas associated with the researcher may find their origins. According to Locke, Spirduso & Silverman (1987) our background, professional training, personal interests and values will inevitably influence how we interpret the collected data and the way that we carry out our research. In this respect, Klein and Myers (1999) also refer to the '*principle of dialogical reasoning'* and

underscore the importance for researchers to be explicit about their own history and intellectual basis. For example, it matters whether a researcher has special 'inside' knowledge and insights or, on the contrary, comes to the study as an 'outsider' with no prior knowledge or prejudices about a group (Minichiello, et al., 1995). There are arguments for and against each. Insiders have the advantage of gaining easy access to participants because of people they know and past associations with members of a group. These relationships can also work against a researcher and limit access to participants. Conversely, outsiders may take longer to recruit their sample and to become familiar with the culture, the language of the group, political issues and the like. While a researcher's gender, age, expertise or ethnic identity can limit or enhance study outcomes, the reality is that most researchers work with what they have or with the resources they have at hand (Minichiello, et al., 1995).

Glaser and Strauss (1967) and Strauss and Corbin (1990) refer to what they call the "theoretical sensitivity" of the researcher. This is a useful concept which the researcher has used to evaluate his skills and readiness to attempt a qualitative inquiry. Theoretical sensitivity refers to a personal quality of the researcher. It indicates an awareness of the subtleties of meaning of data. It "refers to the attribute of having insight, the ability to give meaning to data, the capacity to understand, and capability to separate the pertinent from that which isn't" (Strauss & Corbin, 1990). Strauss and Corbin opine that theoretical sensitivity comes from a number of sources, including professional literature, professional experiences, and personal experiences.

The researcher has an academic background in Library and Information Studies from Loughborough University in the United Kingdom, where a Master of Science title was attained in 1989. As far as academic experience is concerned, his interests have evolved around the interplay between information systems and the social structures within which information systems are embedded. More specifically, the researcher is interested in digital libraries, access to electronic information, the social construction of ICTs and information systems, and the concept of openness. The researcher's perception of ICTs and health information access has been shaped by his personal experiences. For the last 18 years since 1988 he has been working as a librarian at the University of Nairobi library.

More recently, from 1999 to 2004, and prior to enrollment in the PhD programme he served at the College of Health Sciences, University of Nairobi where he was involved in the project dealing with information systems, design and implementation of internet facilities for the college library, and worked closely with medical doctors. This understanding of the context and role enhanced the awareness, knowledge and sensitivity of the challenges, decisions and issues encountered by the medical professionals in the course of their professional duties. The researcher is able to decipher what a person's ideology and assumptions are by listening and asking questions. The credibility of a qualitative research report relies heavily on the confidence readers have in the researcher's ability to be sensitive to the data and to make appropriate decisions in the field (Patton, 1990). Therefore the

researcher's personal experience as information professional in academic environment provides a steady foundation for this project.

3.8 Selection of Research Setting

The study was carried out in Nairobi at the clinical services departments of Kenyatta National Hospital. The primary factors that were considered in selecting KNH were: First KNH is a National Referral Hospital, and the second largest hospital in Africa having 50 wards - with a total bed capacity of 1800, 20 out-patient clinics, 24 theatres - 16 of which are specialized, and an Accident & Emergency Department. It offers highly specialized services such as cardiothoracic surgery, neurosurgery, orthopedic surgery, plastic and reconstructive surgery, radiotherapy, critical care services such as intensive care services, high dependency services, newborn services, renal services and burns management. As a national referral facility, the hospital provides both primary and secondary health care services to Nairobi and its environs. KNH therefore has a high concentration of medical specialties and subspecialties.

Apart from providing patient care, KNH also provides facilities and resources for training, teaching and research to the University of Nairobi, College of Health Sciences and Kenya Medical Training College (KMTC). It is the major training institution for healthcare personnel in various disciplines and a reference point for training postgraduate medical doctors in various specialties and also for providing internship for health professionals. The presence of this mix of features makes KNH appropriate for the study, hence the choice of the

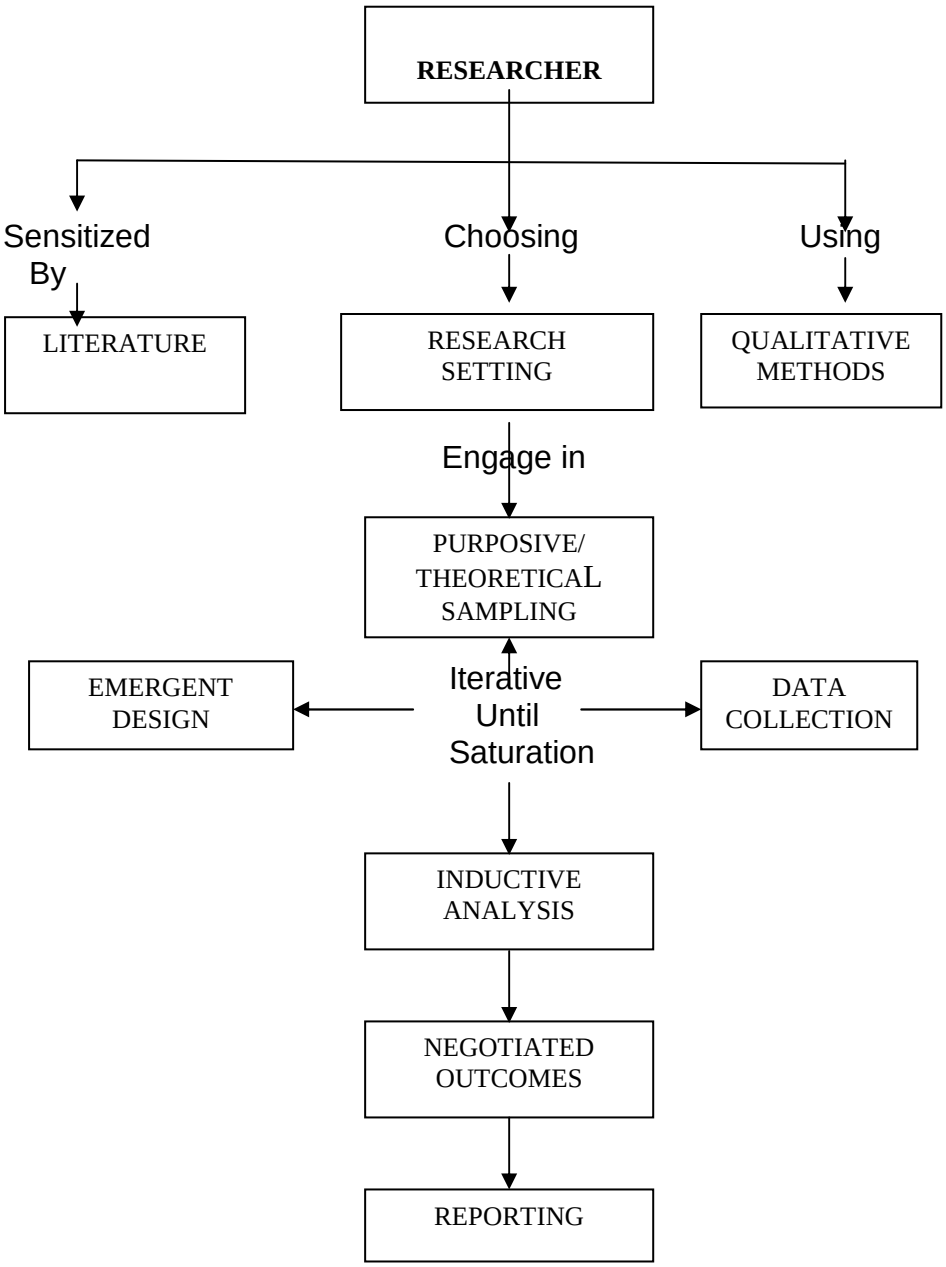
site. Second, the hospital was undergoing reorganization and restructuring in response to the health needs in Kenya and within the region as outlined in its 2005 – 2010 Strategic Plans. This would provide the opportunity to collect empirical data for the study.

Third, having been a Medical Librarian at the College of Health Sciences, and being in constant interaction with the medical professionals in the course of his work, the researcher did not require much effort to develop rapport with the participants. The reason for the choice of the case study was therefore a matter of access and convenience and could provide adequate empirical materials within the limitations of time and funding available for the study.

3.9 Research Plan

This qualitative study sought to investigate the issues surrounding access to health information by medical professionals. With regard to the design of qualitative research, Marshall and Rossman (1999) assert that there are a wide variety of qualitative research genres, each having its own assumptions, methods, procedures and considerations. They described qualitative research as naturalistic, interactive, humanistic, emergent and interpretive. Although qualitative research is characterized by an emergent and flexible design, a basic research plan was necessary to guide this investigation. The following sections detail the research plan by discussing qualitative methods and the procedures used in data collection and data analysis.

Figure 3.2: Flow of the study



3.9.1 The Participants

The participants were drawn from a population of two hundred and seventy one medical professionals employed at Kenyatta National Hospital and who offer patient care in clinical, diagnostic (radiology and laboratory services) dental and pharmaceutical services. These comprised of the following broad categories: Physicians (231), Dentists (30), and Pharmacists (10). Besides the study participants, a purposive sample of three key informants who comprised of two senior hospital administrative staff and one library staff were interviewed.

3.9.2 Sampling Procedure

Purposive or theoretical sampling is used in qualitative research to focus on perspectives of those who are known to experience the phenomenon of interest. An in-depth exploration of an individual's experience is the goal rather than being concerned with the ability to generalize their experiences to a larger population (Lincoln and Guba 1985).

The study followed theoretical sampling strategy as originally defined by Glaser & Strauss. This sampling strategy directs all data collection efforts towards gathering information that will best support development of the emerging theory (Glaser & Strauss 1967). The objective was to sample for maximum variation (Patton 1990), selecting a relatively small sample of great diversity to produce detailed information-rich descriptions of each case. Any shared themes that emerged being all the more important for having come from a small heterogeneous sample. This sample was not chosen on the

bases of some ‘a priori’ criteria, but inductively in line with developing conceptual requirements of the study. The interviewees were chosen for their relevance to the conceptual questions and on the basis of their willingness to participate in the study rather than their representativeness. A total of thirty-nine medical professionals and three key informants were interviewed, each interview typically lasting between fifteen and forty-five minutes each.

In order to build this sample, Maykut & Morehouse (1994) recommend the technique of snowball sampling ‘to locate subsequent participants or settings very different from the first’. Snowball sampling can be accomplished in two ways; the first is to make the initial contact with the key informants who in turn point to the information-rich cases. The second and the technique that was employed in this study is to begin with an initial respondent who, through the process of interview and observation was asked to suggest information-rich cases as well as the characteristics and issues that needed further inquiry. Through this general networking and personal contacts we were able to expand the sample.

The size of the sample could not be predetermined. The total number of respondents to interview was reached heuristically. Although it was possible to acquire more respondents for the research, the decision to stop adding respondents was taken when nothing new was being learnt from the interviews – a state of theoretical saturation had been achieved and the gathered data was believed to be sufficient for a thorough analysis. Patton (1990) has pointed out:

> *… there are no rules for sample size in qualitative inquiry. Sample size depends on what you want to know, the purpose of the inquiry, what is at stake, what will be useful and what can be done with available time and resources…. The validity, meaningfulness and insights generated from qualitative inquiry have more to do with information-richness of the cases selected and the analytical capabilities of the researcher than with the sample size.*

Three key informants were interviewed as a way of triangulating the information from the respondents.

3.9.3 Data Collection Procedures

In qualitative studies, there is a need for multiple types of evidence gathered from different sources, often using different data collection methods. In order to gain rich data that describes the case study and to reduce the likelihood of misinterpretation, various data collection methods and procedures were employed as described in the sections below.

3.9.3.1 Interviews

As a first step in the data collection phase, five pilot interviews with medical professionals were carried out in order to evaluate the interview protocol (Appendix A), to determine the length of time it would take to perform the entire interview and to determine whether the interviewees felt that the time and inquiry was too burdensome. The pilot interviews were transcribed, and included in the study because they had turned out well, i.e. data obtained were rich and of good quality. Only minor semantic and layout revisions were made in the interview protocol. As a result of the pilot interviews, which lasted

between 30 and 45 minutes, it was decided that the interview process should proceed.

Interviews were conducted in three places; either in the Hospital consultation rooms, in the clinics where doctors engaged in private medical consultations or in the medical library discussion room. Potential interviewees were initially identified from those individuals who showed willingness to be interviewed. Further interviewees were selected using snowball sampling since several respondents recommended other medical professionals working within KNH that they knew to have opinions relevant to the research. As recognized by Denscombe (2003), employing snowball sampling proved to be an extremely effective technique of locating information rich cases relatively quickly; a priority considering the time limitations of the study. Moreover, the fact that the said participants were recommended for the study by someone they knew made arranging interviews easier than if each person had been approached 'cold'.

The interviews typically lasted between fifteen minutes and forty-five minutes and were conducted between May and October 2006. At the start of each interview session, permission was requested to use a tape-recorder. But generally the interviewees did not feel comfortable being recorded, and so tape recording was not used; therefore extensive field notes were taken. Some activities such as transcribing, reflection and field notes regarding the description of the data continued until the end of December 2006.

The respondents were provided with an initial overview of the questions, but were not required to follow strict guidelines. A combination of the interview guide approach and the open-ended approach (Patton 1990) was used as a way of making the most of the time available while also collecting systematic data, which is easier to analyze. Furthermore, and in order to obtain the respondents' attitudes, beliefs and feelings with regard to health information access and the use of information and communication technologies, they also needed to be allowed to express themselves freely and in their own words. The interview protocol is provided in Appendix A.

In appreciation of the fact that interviews are "one of the most important sources of case study information (Yin, 1994), interviews were also carried out with key informants as a way of corroborating and triangulating information gathered from the policy and management angles. In-depth interviews were conducted; firstly with the staff in-charge of the library, then with the Systems Administrator (ICT Manager), and then the Planning Manager. Interviewing three informants is considered a reasonable way of overcoming the pitfall of becoming overly dependent on a key informant (Yin, 1994). Again, a combination of the interview guide approach and the standardized open-ended approach (Patton 1990) were used – Appendix B and Appendix C.

3.9.3.2 Observation

During the nine months fieldwork, the numerous visits to the study setting created the opportunity for informal discussions with a number of staff and

direct observations to be made throughout. These informal discussions and casual remarks as well as observations provided insights into the organizational climate; thus providing additional sources of evidence in the case study to complement the interview data. An observation guide (Appendix D) established the nature, types and availability of ICT tools and services, their distribution and types of connectivity and crosschecked their accessibility and areas of information access. This allowed for triangulation. While limited resources did not allow for the use of multiple observers as recommended by Yin (1994), this constraint was appreciated. A summary of the informal discussions and observations were recorded in a diary as part of the field notes.

3.9.3.3 Documentary Sources

As Merriam (1998) stated, documents not only provide valuable information about the facility and the program itself, but they can stimulate thinking about important questions to pursue through more direct observations and interviewing. In addition to face-to-face interviews and observations supplemental documents from the organization such as the strategic plan, annual reports, newsletters, press reports and technical documentations were reviewed. These secondary materials were used to develop background information on socio-political and economic context of the research setting, which helped to reconstruct the history of the setting. The information was helpful to understand the profile of the hospital's overall progammes and management policy.

3.9.3.4 Personal Journal

Directly after each interview, impressions, ideas, reactions and insights were recorded in a diary. The aim was to synthesize key themes arising from an interview, and write prompts about issues to explore with subsequent participants. Events and strategies raised in previous interviews could then be followed up. Relationships between concepts were hypothesized, and could often be pursued in subsequent interviews.

The diary was also used for theoretical memoing, constant comparison and theory generation. Glaser (1978) described theoretical memoing as *"the only way to store ideas"* (p.83) during the mechanics of coding, sorting and writing. He further added that "the point of memos is to record ideas, get them out and the analyst should do so in any kind of language – good, bad or indifferent."(p.78 & p.84) Glaser also noted an important by-product of memoing: the increasing theoretical sensitivity of a researcher to their topic or data. Multiple diaries were used during the course of the study for recording ideas and insights, diagramming and memoing. Diary entries were reviewed from time to time but were not formally entered as data for analysis. Nonetheless, they gave the researcher analytical guides for interpretation of the results.

3.10 Ethical issues and access negotiations

Permission to conduct research was obtained from relevant authorities. Research permit was obtained from the Ministry of Education (Appendix E). Ethical approval was sought and granted by the Ethics and Research

Committee of Kenyatta National Hospital. To get consent to conduct research at Kenyatta National Hospital, it took three months for the research proposal to go through the review board for research and ethical conformance standards of the hospital. (Appendix F). Prior to that, the researcher had to first seek approval from the Director to obtain access to the research setting. It must also be noted that gaining entry does not only include gaining permission, it also includes establishing trust and building up a rapport with all stakeholders, participants, informants and gatekeepers (Patton, 1990).

To further ensure that this research was carried out in an ethical manner, ethical issues were addressed at two levels as part of the research design, and as part of practice. During the design of the research, a number of issues were identified including the need to inform participants of the purpose of the research, to obtain informed consent, the requirement of confidentiality and the right of the participants to decline to participate. Several measures were employed to ensure confidentiality and anonymity was maintained. All field notes and transcribed materials were kept in a secure location. Participants were assured of anonymity by ascribing an ID code number to each participant in the reporting of the data.

Once individuals participating in the study were assured of the confidentiality of information, they were imparting the issue of informed consent. Participants were fully informed of the nature of the research both verbally and in writing. Some researchers advocate the use of an informed consent form. Seaman (1987) indicates that the form and accompanying information sheet “must

include all the information that the subject needs in order to make an informed decision to participate in the research or not". With this guidance an informed consent form (Appendix G) was designed which participants were requested to complete.

3.11 Data Analysis Procedure

Qualitative data analysis is defined as *"working with data, organizing it, and breaking it down into manageable units, synthesizing it, searching for patterns, discovering what is important to be learned, and deciding what you will tell others"* (Bogdan and Biklen 1992). In qualitative research data analysis has two-fold purpose; (a) to understand the participants' perspectives, and (b) to answer the research questions. Qualitative research is an investigative process in which researchers attempt to acquire a deep understanding of the study participants. Methods are selected that encourage the sharing of both cognitive and affective insights. In the heuristic process, the researcher has a special perspective on the entire study that allows him or her to evolve the design as the study proceeds.

Data analysis is continuous and enables a researcher to work simultaneously with both the process and the product. Tesch (1990) identifies the following practices for qualitative research analysis and interpretation: (1) analysis occurs throughout data collection process, (2) analysis is 'systematic and comprehensive, but not rigid', (3) accountability is provided through reflective notes, (4) data is sub-divided into smaller units, yet the researcher must look at the whole, (5) the process is inductive, themes emerge throughout the

process, (6) comparison is the main analytical process used to refine categories and discover patterns, (7) modifications are made throughout the study with flexible categories, (8) there is no standardized way to analyze data, (9) the procedure for analysis is not “scientific” but requires “ intellectual competence”, and (10) the results of the analysis is a descriptive synthesis of a pattern, theme or theory (Tesch 1990 pp. 95-97).

There are many strategies commonly used in analyzing qualitative data. One strategy involves a general review of data with reflective notes to aid in sorting, followed by verification by informants. The data is then reduced by the use of metaphors and the creation of graphic organizers (Bogdan and Biklen 1992). Another technique is the use of Spradley’s analytical model. Spradley’s model for domain, taxonomic, componential and theme analysis provide a practical analytical map for systematically identifying patterns of behaviour and conversational themes from the data. The primary method of qualitative analysis used in this study was the grounded theory. Grounded theory approach is a method that uses a systematic set of procedures to develop an inductively derived theory or model about a phenomenon, the details of which are discussed in the following section.

3.11.1 Grounded Theory Approach

Grounded theory (GT) is well suited to analyzing the collection of data from multiple sources and multiple perspectives. As an inductive theory, grounded theory makes no distinction between theory and design. In fact the theory is a guide to design. It also is an approach for evoking a theory about context from

data, as opposed to imposing a hypothesis upon evidence. The theory evolves from coding the data, which leads to the identification of categories and themes, and allows for a close relation between data, analysis and theory. These categories give rise to hypotheses that are then strengthened, modified or rejected after further coding of the data and the continuing investigation of the relationships between the categories (Strauss and Corbin 1990).

According to Glaser (1978) and Strauss (1987) who expounded the theory, constant comparisons together with theoretical sampling constitute the core of qualitative analysis in the grounded theory approach. Tesch (1990) adopts this view when she calls comparison the main intellectual activity that underlies all analysis in grounded theory:

> *The main intellectual tool is comparison. The method of comparing and contrasting is used for practically all intellectual tasks during analysis: forming categories, establishing the boundaries of the categories, assigning the segments, summarizing the content of each category, finding negative evidence, etc. The goal is to discern conceptual similarities, to refine the discriminate power of categories and to discover patterns. (Tesch 1990)*

By comparing, the researcher is able to do what is necessary to develop a theory more or less inductively, naming categories, coding, delineating categories and connecting them.

Glaser (1992) offers a more succinct delineation of the process of theoretical sampling. He states that:

> *…the general procedure of theoretical sampling is to elicit codes from the raw data from the start of data collection through constant comparative analysis as the data pour in. Then one uses the codes to direct further data collection, from which codes are further developed theoretically with properties and theoretically coded connections with other categories until each category is saturated. Theoretical sampling on any category ceases when it is saturated, elaborated and integrated into the emerging theory.*

With grounded theory, data collection and analysis are linked from the beginning of research, proceeding in parallel and interacting continuously. Three stages are apparent in this type of data analysis namely, *open coding, axial coding,* and *selective coding* (Strauss and Corbin 1990). *Open coding* is the initial process, which involves breaking down, analysis, comparison and categorization of data.

During this stage, the researcher must identify and tentatively name the conceptual categories into which the phenomena observed would be grouped. The goal is to create descriptive, multi-dimensional categories, which form a preliminary framework for analysis. Words, phrases or events that appear to be similar can be grouped into same category. These categories may be gradually modified or replaced during the subsequent stages of analysis that follow.

As the raw data are broken down into manageable chunks, the researcher must also devise an “audit trail”- that is, a scheme for identifying these data chunks according to their speaker and context. The particular identifiers developed may or may not be used in the research report, but speakers are

typically referred to in a manner that provides a sense of context. Qualitative reports are characterized by the use of participant quotes that illustrate the themes being described.

The next stage of data analysis involves re-examination of the categories identified to determine how they are linked, a complex process referred to as *axial coding* (Strauss and Corbin 1990). The discrete categories identified in open coding are compared and combined in new ways as the researcher begins to assemble the “big picture”. The purpose of coding is to not only describe, but more importantly, to acquire new understanding of the phenomenon of interest. Therefore, causal events contributing to the phenomenon; descriptive details of the phenomenon itself; and the ramifications of the phenomenon under study must all be identified and explored.

The final stage of analysis is referred to as *selective coding*. This is the process of selecting the core category, systematically relating it to other categories, validating those relationships, and filling in categories that need further refinement and development. The ideas are grouped into a more structured framework of higher order themes. During selective coding the researcher is responsible for building a conceptual model and for determining whether sufficient data exists to support the interpretation.

Although these stages of analysis are described in a linear fashion, in practice they may occur simultaneously and repeatedly. At any stage of coding the

researcher may determine that the initial categories identified must be revised, leading to re-examination of the raw data. Additional data collection may occur at any point if the researcher uncovers gaps in the data. In fact, informal analysis begins with data collection, and can and should guide subsequent data collection. This process can continue until theoretical saturation is obtained, that is, when additional analysis no longer contributes to discovering anything new about a category.

3.11.2 The process of data analysis as applied in the study

The data processing strategy adopted was to transcribe the interviews and field notes. In total, including the pilot data thirty-nine interviews were transcribed with an average length of thirty minutes. The shortest interview was fifteen minutes in length, the longest forty-five minutes.

The analysis followed grounded theory approach as already indicated. Categories were generated inductively after cross-case analysis and open coding was done for each question in the interview. This involved an analysis of each question, noting key remarks, concepts or categories, cross-referenced to interview occurrences (interviewee number(s), interview question(s) and field notes, which as described by Ellis (1993) 'represented a kind of item-on term approach'. Cross-case coding of each question in the interview schedule meant that all the data in each question and from each interview was covered thus leading to analytical exhaustivity.

3.11.2.1 Coding

Interview data

As theoretical frameworks did not guide the study, the interview guide was adopted as the starting point. Substantive statements in response to questions asked in interviews with respondents were coded. There were no specific rules to define which segments of the text would be coded; these segments were chosen based on the existence of clues for the presence of coding categories. There was no restriction concerning the number of codes assigned to a segment of text. Most of the interview texts were considered useful data.

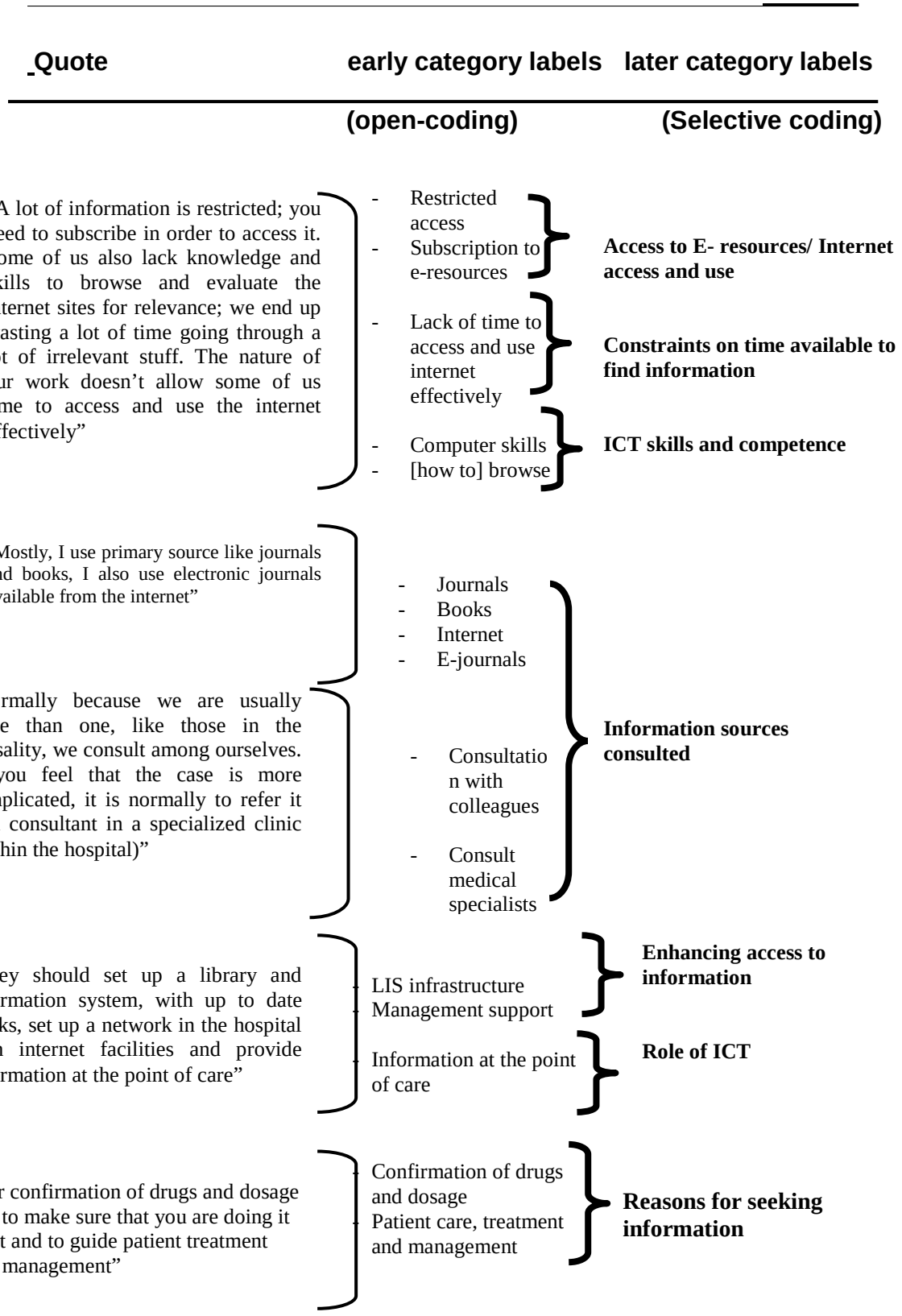
At the start of the field study, the comparison was conducted within one interview, to identify and generate basic categories in order to describe features of the data. In this process of open coding every sentence/phrase or word was studied to determine what exactly has been said and to label the relevant ones with adequate code. As an example, in the present study, when an event, behaviour or process involved an element of computer literacy and abilities to search for electronic information resources, the text was labeled '*ICT skills and competence '*. By comparing different parts of the interview, the consistency of the interview as a whole was examined. The aim of this internal comparison in the context of open coding process was to develop categories and to label them with the most appropriate codes. For example, text about different *"Limitations to information access" was* grouped together in one file. In the N6 software program, these files or groupings of texts are called nodes. The nodes were then clustered together into

categories and given conceptual names (Miles and Huberman, 1994). For example, when participants talked about actions such as consulting or discussing with fellow colleagues, or use cybercafé to resolve a clinical uncertainty, this category was provisionally called "*Information sources*". In this way it was possible to formulate the core message of the interview with codes that were attached to it and to understand the interview including difficulties, highlights and inconsistencies. Thus coding was the process and categories were the outcome.

This initial analysis generated a list of provisional codes, that is, a distillation of the interview into an inventory of provisional codes or a conceptual profile; and memos, which described the analysis process. As descriptive codes, these had no specific order or relevance to each other until later phases of coding. Once this initial coding was completed, the researcher was able to apply the constant comparative method in each of these segments of data and to start developing finer grained coding - second and third levels of coding.

All subsequent interviews were treated as described above. As soon as more than one interview had been conducted, the interviews were compared. The first eight interviews were constantly compared; the generated codes were then grouped together into a more coherent framework of ideas. Iterative recoding has primarily been used as a first order organization bringing some order and coherence to the mass of data.

Figure 3.3 – Coding Scheme



In the next process of *axial coding* links and relationships were sought between categories. Themes and patterns were identified. Dey (1993) called this stage of analysis *connecting*, where coded data are linked in some way. These relationships later develop into a framework or provisional theory; which can be represented diagrammatically. An example of how data were managed in the early stages of open coding is presented in Figure 3.3. The figure also illustrates how these categories were labeled in the later stages of data analysis.

Open and axial coding did not occur in a linear fashion. There was continual switching between the two modes. If open coding involves the fragmentation of data, with the aim of identifying new categories, the axial coding involves putting the data back together again in new ways, making connections between categories and subcategories (Strauss and Corbin, 1990).

Creating links and relationships also involved *constant comparison*. Axial coding involved selecting and "fitting" alternate models or theories to the data. This meant developing and testing alternative explanations against the data until the best fit was obtained. Morse (1994) described this challenging work as "an active, continuous and rigorous process of viewing data as a puzzle". (Morse, 1994) The process involved speculation and conjecture, revision and rethinking. Three distinct sets of core categories were identified at this stage:

- Information needs and information seeking behaviours
- Access to information resources

- Access to electronic health information resources

As the analysis continued at the axial coding stage, these categories were further re-examined and compared to discover the various inherent codes or subcategories. For example after analysis, the *information needs and information seeking behaviour* category gave the following subcategories:

- Participants' characteristics and work environment
- Types of information needed
- Information sources consulted
- Use of clinical guidelines and protocols
- Reasons for seeking information

Access to information resources category produced the following subcategories:

- Availability of information services
- Limitations to information access and usage
- Constraints on the time available to find information
- Impact of information on clinical decision making

In the *access to electronic health information resources* category gave the following eight subcategories:

- Role of ICT
- Availability of ICT
- Internet access and use
- Use of health information databases

- Use of mobile phone
- Telemedicine
- ICT skills and competence
- Opportunities for enhancing increased access to health information

Once the core categories were decided upon, all the categories and subcategories were reexamined and related to the core categories and to each other during the *selective coding* stage to arrive at a final list of three major themes (Table 3.1) which were frequently occurring across the interviews thus representing commonly held views whist recognizing that there may be validity in the particular experience of one individual.

Table 3.1: Summary of Major Themes

Information needs and information seeking behaviour
Access to information resources
Access to electronic health information resources

There was a remarkable consistency between the prevalent themes identified in each stage of analysis. At a top level there were several findings that stood out. These are:

- All medical specialties reported needs for information, and specific information; the participants interviewed saw information access as personally important.
- Clinical governance and care of patients lead the reasons for needing and seeking information with professional updating on current medical practices, clinical questions and decisions as well as delivering and attending training high on the list.
- Medical professionals consulted a wide range of information sources found in other institutions away from their workstation.
- Library and information services at KNH are either inadequate or nonexistent for the clinicians. Instead a limited collection of books was housed together in a small office room. The majority of staff was unaware of what library and information service could offer them and how it could benefit their work.
- When the medical professionals experienced clinical uncertainty, they preferred to seek information from their professional colleagues.
- Textbooks and medical journals are the mostly used information sources. However, there is a substantial prevalence for e searching for information with the top sources to find information given as Internet and e-journals.
- Google is the leading and the most popular resources used.
- ICT skills and competence has not caught up with the increasingly technical environment for information access. Medical professionals interviewed expressed concerns with their inability to effectively utilize ICT and particularly the internet-based health information resources.

- Access issues, both physical and electronic are the greatest barriers to information use.

The main categories and sub categories that were identified during the analysis are discussed in the subsequent chapters under the following headings:

- Information needs and information seeking behaviours
- Access to health information
- Access to electronic information resources

Observation notes

Observation notes for the case study were written in note book and were not transcribed. The volume of observation data was small and easily managed in its raw state. Observations were used to confirm or disapprove points made by respondents or documents. Where an observation was linked with other data in this way a memo was used to ensure that this data was not overlooked.

Document analysis

Where possible documents were photocopied; if permission to photocopy was not granted, notes were taken in the researcher's personal journal. A small number of documents were available in electronic form. As with the observational notes, and where possible useful data was linked with other data by way of memos.

3.11.2.2 Saturation

The constant comparative method is iterative. Each change made in the coding schemes- creating new categories for example – required a complete review of the data to check for presence of the new category. In order to reach a final version of the code scheme, several passes through the entire corpus were necessary. Upon completion of the analysis of 33 transcripts, the checking for category saturation began. The 6 remaining interviews were then analyzed and they fitted in with the set of the existing categories. Some new specific codes were identified but no new categories emerged.

3.11.2.3 Coding consistency check

Neither the naturalistic paradigm nor the grounded theory methods indicate mechanisms for checking code reliability. The coding process is a reflection of the researcher's evolving understanding of the environment under investigation. Such understanding comes from the prolonged involvement within the research site. Coding was done concomitant with both data collection and analysis. Thus, it would not have been feasible to have code checkers replicating the same process that the researcher used in order to check code reliability.

The second axiom of the naturalist paradigm states that: "the enquirer and the object of enquiry interact to influence one another, knower and known are inseparable." (Lincoln & Guba 1985 p.37) In this approach there is a direct relationship between the researcher and the phenomenon. Lincoln & Guba (1985) go even further:

> *… the design is emergent and its form depends ultimately on the particular interaction that the investigator has with the phenomena, then one could not expect corroboration of one investigator by another.* (p.307)

Additionally, in comparing naturalistic data processing with conventional content analysis, Lincoln and Guba state that rules in naturalistic data analysis need not be finally formulated until the end of the inquiry. (p.337)

Based on this rationale, but at the same time striving to provide additional elements for judging the study's credibility, the following procedure was adopted to check for coding consistency (rather than code reliability). When data coding was completed, the researcher requested an independent reviewer who was conversant with qualitative research evaluation methods to check the consistency of his coding. Checking consistency is somewhat different from performing an intercoder reliability check. In checking for consistency all that is required is that the checker do identify codes inconsistently applied, not the reliability of the codes themselves.

The code checker received the coding scheme with a brief explanation of categories and codes, and a sample of segments of texts from the interview transcripts and was asked to check for coding consistency. This procedure resulted in some fine adjustments to the coding. After completing this process the researcher felt confident about the consistency of his coding.

3.11.2.4 Data analysis support tool

Qualitative data analysis software, N6, developed by Qualitative Solution and Research (QSR) was used to assist in the analysis. All data were transcribed and typed in rich-text format and imported into the software as documents. Then as data was reviewed and compared and categories emerged, nodes were created in the software and the text was “coded” on the respective node(s).This allowed for easy comparisons of text coded on the same node and across nodes. As analysis progressed, memos of emerging hypotheses were documented within the software at both the document and node level. As hypotheses were tested and strengthened, nodes were modified (ordered, combined, collapsed etc). The software allowed this functionality without loss of coding. The data processing strategy adopted was to transcribe the interviews and field notes. The use of the computer aided qualitative data analysis software N6 for processing data meant that the transcriptions were manageable within a reasonable period.

3.11.2.5 Methodological challenges

During the course of this study some decisions that affected the quality of the study results were made. Some of these decisions were seen as methodological challenges. Three such critical decisions were anticipated.

Drawing the boundaries

The holistic approach of a case study brings up the question of what evidence should be included. Observations and interview boundaries were defined as

the research developed. In choosing such boundaries, inevitably some comprehensiveness and completeness of details were lost.

Sampling

Sampling stopped as categories reached saturation. It is not possible to saturate all categories. In this respect, Miles and Huberman (1994) say:

> *Fieldwork understanding comes in layers, the longer we are in the environment the more layers appear to surface, and the choice when to close down, when to go with a definitive coding scheme or a definitive analysis can be painful. That choice may be dictated as often by budget constraints as on scientific grounds.*

So, the researcher had to decide on those that he judged as the most relevant for describing the phenomenon, the core categories (Strauss and Corbin 1990). However, there was a degree of uncertainty in this decision.

Participants' responses

Another methodological challenge was the ability of the researcher to stimulate the respondents to reconstruct the context in which information seeking occurred and the ability of respondents to recall situations being investigated. In some cases respondents demonstrated difficulties in fully and richly recalling situations being investigated. The study therefore relied on the discovery of the overall and strongly prevalent patterns of behaviour, but it is acknowledged that the findings may not be exhaustive and comprehensive. Considerations of these challenges are further addressed in the Section 3.12 below.

3.12 Rigour and Trustworthiness

Trustworthiness in qualitative research refers to the credibility, believability and faithful interpretation of participants' experiences. Regardless of the paradigm used, a researcher is still required to show that a study is valid, credible and rigorous (Lincoln & Guba, 1985; Seale, 1999). The positivist notion of validity has been reconceptualised and replaced with the terms such as trustworthiness and credibility. However, unlike studies based upon the positivist tradition, qualitative researchers often do not use standardized methods of data collection. Consequently, more detailed and elaborate record of the research process is required than might be expected for quantitative studies (Murphy et al., 1998; Strauss & Corbin, 1990). This record is sometimes called an audit trail (Murphy et al., 1998), and allows a reviewer to judge authenticity and trustworthiness. In the present study the issues of rigour and trustworthiness were addressed by adopting the terminologies and perspectives suggested by Lincoln and Guba (1985). These are *credibility, transferability, dependability,* and *confirmability*.

3.12.1 Credibility

"Credibility" is the term that is analogous to "internal validity". Credibility addresses the issue of truth-value and can be expressed by scrutinizing three basic questions: (a) "Do the conclusions make sense?" (b) "Do the conclusions adequately describe research participants' perspectives?", and (c) Do conclusions authentically represent the phenomena under study?"(Lincoln & Guba 1985) and (Miles & Huberman 1994)

According to the authors, the implementation of the study's credibility is related to the methodological strategies that enhance and demonstrate credibility. In this study, using the following strategies enhanced credibility:

3.12.1.1 Prolonged engagement in the field

By implication, prolonged immersion in one study area will improve the likelihood of a true interpretation of the participants' experiences. Since one of the data collection methods was observation, the researcher tried to spend enough time at the site to learn the local culture and work practices in depth. The prolonged engagement also provided an opportunity to establish good rapport with respondents and to mitigate against eventual misunderstanding (or misinformation) during the research process. The involvement of many weeks duration in the fieldwork also seemed to reduce the perception of researcher as an outsider; thus helping in attenuating the possibility of the 'Hawthorne effect' (Cook & Campbell, 1997).

3.12.1.2 Triangulation

Triangulation as a term originates from naval, military and survey contents (Nolan & Behi, 1995) where the position is plotted using three separate reference points Speziale & Carpenter, 2003). However, the term is also used in qualitative research and refers to:

> *… an approach to data collection in which evidence is deliberately sought from a wide range of different, independent sources and often by different means (Mays & Pope, 1995, p.110)*

A primary aim of triangulation is to enhance validity and reduce bias (Minichiello, et al., 1995) Triangulation can refer to multiple data sources, investigators or analysts, ways of interpreting the same data sets, or methods (Denzin, 1989). Consequently, the present study's findings are based upon various sources of information and data gathering methods. Interviews with participants were supplemented with observations, discussions with key informants and documentary sources, which helped to triangulate data.

3.12.1.3 Elicitation

To increase credibility (data validity), face-to-face interviews and observations (refer Appendix A, B & C for the interview protocols and Appendix D for the observation guide) were used. These data collection methods gave the researcher the opportunity to develop a rapport with respondents and more easily probe the data being gathered.

3.12.2 Transferability

"Transferability" is the term analogous to "external validity". It addresses the issue of applicability. Lincoln and Guba (1985) suggest that the degree of transferability is an empirical matter and directly related to the similarity of two contexts: the context where the study was originally developed and the context to which findings may apply.

> *"Naturalists can provide only the thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility."*(Lincoln & Guba 1985)

Yin suggests that, in terms of generalizability, the researchers should look at case studies in similar ways as they look at experiments where findings rely on analytical generalizations. *"In analytical generalizations, the investigator is striving to generalize a particular set of results to some broader theory".* (Yin 1989)

Accordingly, this study produced a thick description of the phenomenon and propositions. Maximum variation sampling, which promotes the inclusion of as much information as possible in the various ramifications of the categories being investigated, was adopted. In adopting this strategy for sampling, the research results hopefully provided sufficient descriptive data to make transferability judgment possible. It will be up to the researcher, who seeks to transfer findings to judge the adequacy of the application of the study's findings to the new setting.

3.12.3 Dependability

"Dependability" in naturalistic inquiry is analogous to "reliability" (usually demonstrated by replications) and it addresses the issue of consistency. Four measures were adopted to ensure dependability:

- Systematic application of constant comparative method for data analysis;
- Meticulous and explicit documentation of the whole research process (audit trail);
- Reflexive journal: As soon as the field work started, the researcher began a journal (see section 3.8.3.4) that was used throughout the

research study. The purpose of this journal was to record the activities, ideas and decisions that were made during the research process. The intention was to use the journal as a master calendar of events as I made interview appointments, set deadlines, and identified the stages of the study progress. Additionally, the journal became my personal diary of notes regarding my own perceptions, feelings and interactions with participants; and

- Code consistency check by an independent reviewer.

3.12.4 Confirmability

"Confirmability" is the term used in the naturalistic inquiry that is analogous to "objectivity" and it addresses the issue of neutrality; e.g. the extent to which the findings are reflective of the participants' perspective as evidenced in the data rather than being a reflection of the researcher's perception or bias. While it is acknowledged that the researcher brings his "person" to the study; to enhance comfirmability in the present study, the researcher stated explicitly his assumptions about the topic of interest in relation to his own contributions or as they were otherwise brought to his awareness. At the same time, the interviews, to the extent possible contained open ended questions and value-free questions that allowed for gathering a more comprehensive view of the context.

3.13 Summary

This chapter has outlined the methodological framework utilized within this study. The interpretive approach to conduct the research was regarded as

appropriate and the case study strategy was chosen since it fits the philosophical assumptions underlying this research. These choices were comparable with the goals in this study. A single case study was selected because it offers a unique opportunity to study the complexities of access to electronic health information resources in a resource-poor setting in detail.

The primary data collection method for this qualitative, interpretive study was semi – structured interviewing. Participants were interviewed between May and October 2006, in the hospital consultation rooms, private clinic or in the medical library discussion room. Interviews were transcribed in text rich format and entered into a computer software program in preparation for data management, although collection and analysis occurred concurrently. Secondary data collection methods included observation, field notes and documentary sources. Congruent with the grounded theory approach, theoretical sampling and constant comparative analysis have been central to this study. The ethical aspects associated with this research have been addressed within the chapter. The strategies to enhance the quality of the study were implemented along with study development are as well discussed.

During data analysis three major categories were identified. These are:

- Information needs and information seeking behaviours;
- Access to information resources;
- Access to electronic health information resources

These themes have been used as the framework for presentation of the study findings in the subsequent chapters.