Information seeking behaviour of physicians in Tanzania

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Abstract
The study investigated the information seeking behavior of physicians at the public hospitals in Tanzania, with a specific focus on the largest national and referral hospital in Tanzania, namely Muhimbili National Hospital (MNH). Questionnaires were personally distributed to all physicians (n=259) at MNH. The rate of response was 83 % (n=215). Based on the literature review, a Wilson (1996) model was used to systematically guide the assessment of the physicians' information seeking behaviour at MNH. The study found that physicians needed specific medical information to enhance their knowledge on a daily basis, particularly they needed information on patient care, rather than information for research and further education purposes. In order to fulfill their information needs, physicians preferred to seek information from the formal sources, which included printed textbooks, electronic resources and printed journals. However, there was low use of internet for prescribing various drugs and diagnosis. Factors, such as poor ICT infrastructure, followed by lack of access to a computer, frequent power cuts and lack of time were the major barriers that inhibited physicians to seek information. It is thus important for the MNH management to promote information literacy (IL) issues; improve ICT infrastructure, establish a resource centre, and integrate use of internet and e-resources for patient care within clinicians working hours; and for the government to improve the supply of reliable electricity at MNH for effective medical practices.

Keywords
Information needs, Information seeking behavior, physicians, medical doctors, Tanzania, Africa

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Introduction
Access and use of health related information among medical doctors is important to provide a high quality of health services and to solve various health issues. In their medical practice, "physicians experience very specific information needs, in relation to which precision, reliability and promptness are fundamental aspects" (Martinez-Silveira and Oddone 2008). Although aware of over 400 diseases that are regularly encountered in clinical practice, physicians may not have knowledge of uncommon diseases (Hofmans-Okkes et al. 1994). Physicians need to access information in response to information needs as they arise, with searches often being conducted in the presence of their patients, for the purpose of reducing medical errors and ensuring quality health care services (Flynn and McGuinness 2011). Physicians need to access current and contextual medical information that meets their needs to improve their medical services.

Physicians, however, particularly in poor countries, experience difficulties in accessing information that could improve the quality of their work (Kale 1994; Katikireddi 2004; Lwoga and Matovelo 2005). Information overload is one of the major challenges, especially in the health field, where the scholarly information doubles every 20 years (Wyatt and Sullivan 2005). Access to e-resources and adequate information searching skills can enhance the use of e-resources by physicians, although "it will depend on how adequately they meet the unique information needs of clinicians" (Woolf and Benson 1989). It is thus important for medical doctors to use all the available sources of information, including electronic sources, in order to keep up with clinical evidence for their benefit, their patients' benefit, and to communicate with their colleagues (Coumou and Meijman 2006). Various researches conducted in several countries have recognized such needs (Davies 2007; Weitzman and Shiffman 2001).

In spite of the growing emphasis on Evidence-Based Medicine (EBM) within healthcare, little research has been carried out on physicians' information behaviour in the developing world, especially in Tanzania. Although the information needs and information-seeking behaviour of the physicians in other African countries may be similar to those in Tanzania, the clinical setting is different. This study addressed an important knowledge gap in the literature by identifying the information needs of physicians during their daily clinical practice and understanding the information-seeking behaviour they adopt to satisfy these needs at the major public hospital in Tanzania, namely Muhimbili National Hospital (MNH). The objectives of the study were to ascertain:

a) physicians' information needs
b) information-seeking patterns of physicians
c) reasons activating physicians to seek health information
d) barriers to information seeking.

A brief background on information-seeking behaviour and the information-seeking patterns of physicians and their application in the context of high income and low-income countries are presented together with the theoretical framework.

Information needs and information seeking behaviour

An individual may be motivated to engage in health information-seeking behaviour in an attempt to fulfil his or her needs (Wilson 1981). Before defining information need, it is important to understand the concept of a 'need'. According to Wilson and Walsh (1996), a need is a "subjective experience, which occurs only in the mind of the person in need and, consequently, is not directly accessible to an observer". There must be subjective expression for a person to experience information need and to engage in information-seeking behaviour. Information need is defined as "a recognition that personal knowledge is inadequate to satisfy a goal that needs to be achieved" (Case 2002). Information

needs may be divided into physiological needs (e.g. need for shelter, food, etc.), affective or emotional needs, and cognitive needs (e.g. need to learn a skill, etc.) (Wilson 2000). However, it is not necessary that information needs translate into information-seeking behaviour; several personal and contextual factors may enhance how an individual responds to information need (Case et al. 2005). Information needs are thus a requirement that may drive physicians into an information-seeking process to meet their information gaps.

It is important to define what information-seeking behaviour means before embarking on health information-seeking behaviour (HISB). Information seeking behaviour "is the purposive seeking for information as a consequence of a need to satisfy some goal. In the course of seeking, the individual may interact with manual information systems (such as a newspaper or a library), or with computer-based systems (such as the World Wide Web)" (Wilson 2000). On the other hand, HISB refers to the strategies or approaches which an individual uses to acquire information (Lambert and Loiselle 2007). This study adopts the definition of health information seeking by Niederdeppe et al. (2007) as "…active efforts to obtain specific information in response to a relevant event". HISB is thus a process through which individuals use a purposeful strategy to seek information to fulfil their information gaps. In conducting research, scholars emphasize the need to identify the information gap an individual seeks to cope with stressful circumstances, and to assess the amount of information searched, information sources, and when or under what circumstances the information is needed (Rees and Bath 2001). A review of 100 published articles and five books reporting on HISB further identified the major characteristics of HISB as, "the type and amount of health-related information sought, the specifications implemented to obtain the information, and the sources individuals use" (Lambert and Loiselle 2007).

Physicians' information seeking behaviour

Knowledge about the information needs and information seeking behaviour of physicians is crucial to effectively satisfy the felt information needs and improve the delivery of health care services in a country. The literature shows that there is a need for a well-coordinated information system that delivers relevant information to fulfil the needs of the public health workforce (Revere et al. 2007). Various studies have demonstrated this scenario. A recent review of the literature (1995 and 2009) on doctors' information needs in high income countries revealed that doctors mainly needed information in the following areas: clinical care, Continuing Professional Development (CPD) and patient information (Younger 2010). Information on diagnosis and treatment were also major information needs for primary care physicians in Spain (Gonzalez-Gonzalez et al. 2007). Information on patient care was also a major information need of physicians in Ireland (Flynn and McGuinness 2011) and the United Kingdom (Bryant 2004). The information needs in low-income countries were broadly the same. For instance, the major information needs of physicians in Brazil were related to drug therapy (Martinez-Silveira and Oddone 2008); in Uganda they were associated

with specific medical details (Ocheibi and Buba 2003). These studies demonstrate that information needs of physicians may fall into two categories, as illustrated by Wilson and Walsh (1996), which include cognitive (factual information about disease prevention, detection, and/or treatment) and affective (information that deals with disease emotionally).

Physicians use a variety of information sources to fulfil their information needs, about which they first rely on their colleagues and medical textbooks or journals. For instance, studies from high-income countries indicated that physicians often seek information to answer a limited number of clinical questions, about which they first consult colleagues and printed materials (Callen et al. 2008; Coumou and Meijman 2006; Davies 2007; Verhoeven et al. 1995). Another source confirmed that doctors used colleagues as their first source of information (Younger 2010). Studies from low-income countries also showed that colleagues remained the major source of medical information for health professionals in Uganda (Kapiriri and Bondy 2006; Tumwikirize et al. 2009) and Brazil (Martinez-Silveira and Oddone 2008). Colleagues were used at a high rate due to their availability, affordability, and reliability.

With the development of technology, the practice has started to change through the years. Some recent studies have reported Internet or electronic resources as popular sources of information for physicians. A study by Jackson et al. (2007) on the information-seeking behaviours of health and social care professionals in Barnsley, England, showed that the Internet had high use among professionals, followed by informal networks such as verbal queries to colleagues, libraries or written resources. However, other studies have reported printed materials as dominant sources of information to physicians. Studies in the United Kingdom (Bryant 2004) and Ireland (Flynn and McGuinness 2011) found that printed materials were popular sources of information, while the Internet and electronic sources were ranked second. In developing countries, a Nigerian study found that medical doctors preferred to access information from publishers' catalogues, followed by consultation with colleagues (Ocheibi and Buba 2003). It is obvious that colleagues, the Internet or electronic resources, and textbooks or journals remain the major sources of information to physicians, depending on various factors. The least frequently used sources in high-income countries include medical libraries (Bryant 2004; Coumou and Meijman 2006; Martinez-Silveira and Oddone 2008; Verhoeven et al. 1995), bookshops and hand-held personal computers (Jackson et al. 2007). The trend was almost the same in low-income countries, where libraries were rarely used by physicians to satisfy their needs in Brazil (Martinez-Silveira and Oddone 2008) and Uganda (Kapiriri and Bondy 2006). The library is rarely used by physicians in low-income countries due to poor and outdated collections. The literature reflects the fact that the information-seeking behaviour of physicians is very specific, and varies from physician to physician and from location to location. This behaviour is influenced by "availability, physical distance, costs, convenience, skills and perceived relevance of information" (Kapiriri and Bondy 2006).

There are numerous barriers that physicians encounter in an effort to fulfil their information needs. Various authorities have demonstrated these issues. Wilson and Walsh (1996) described these factors as personal, emotional, educational, demographic, social/interpersonal, environmental, economic, and source characteristics. Literature from 1996 to 2006 on the information-seeking behaviour of doctors found that the major barriers that limited the use of e-resources were related to issues with 'online resources' or 'information technology (IT)', followed by lack of time, limited search skills, lack of basic IT skills, and irrelevant materials (Davies 2007). The major barriers that inhibited physicians from seeking information in other high-income countries were related to time constraints (Coumou and Meijman 2006; Flynn and McGuinness 2011; Masters 2008), insufficient access to resources (Flynn and McGuinness 2011), inadequate search skills (Coumou and Meijman 2006; Masters 2008), workload, cost, too much information, and liability issues (Masters 2008). Lack of time and a distinct preference for asking an expert colleague or consulting a printed source were also major barriers to effective online searching reported by doctors in a review of the literature (1995 and 2009) (Younger 2010). The results were broadly the same in low-income countries. For instance, irregular supply, lack of time, and high access costs were the main barriers for physicians in Uganda (Tumwikirize et al. 2009).

Theoretical framework

Many information-seeking models have been developed in the past decades with a view to improving information access for users. Existing information seeking behaviour models include those of Wilson (1981; 1999), Krikelas (1983) and Kuhlthau (1991). The present study, however, focuses on the Wilson 1996 information behaviour model (see Figure 1) (Wilson 1999) in order to explain the information needs and information seeking patterns of physicians at Muhimbili National Hospital (MNH). The Wilson model was chosen over the other information behaviour models because it addressed all objectives of the present study. This model has also been used in several studies conducted previously, including Lwoga et al. (2010), regarding farmer's information behaviour in Tanzania; and Ikoja-Odongo and Mostert (2006), concerning the information seeking behaviour of South African parliamentarians and Ugandan informal entrepreneurs.

Wilson's 1996 model was built from that of 1981, drawing upon research from a variety of fields other than information science, including decision-making, psychology, innovation, health communication and consumer research (see Figure 1). The model suggests that an information user engages in information seeking behaviour in order to satisfy a perceived need. The user searches information from formal or informal information sources or services, which may result in success or failure in finding relevant information. If successful, the user may make use of the information. Otherwise, the user may be fully or partially satisfied, or may fail to fulfil the perceived need, and repeat the search process.

In the process of seeking information, the user may encounter intervening variables, which may be supportive of information use as well as preventive. These variables may include: personal characteristics, emotional variables, educational variables, demographic variables, social/interpersonal variables, environmental variables, economic variables, and source characteristics.

Methodology

A case study research design was used in this study and it was conducted at Muhimbili National Hospital (MNH) in Dar es Salaam. MNH was selected because it is a major public referral hospital in Tanzania. Questionnaires were personally distributed to all physicians (n=259) at MNH. This study refers to 'physicians', which in this context includes all medical and surgical doctors, including general practitioners (GPs). A structured questionnaire was used to collect data. The researcher ensured that relevant research permits were obtained before the commencement of data collection. Approval to conduct this study was sought from and granted by the Muhimbili University of Health and Allied Sciences (MUHAS) Ethical Review Board in Tanzania. The introduction letter obtained from the MUHAS was used to get permission to conduct research at MNH. A list of all physicians was requested from and granted by the Human Resource Officer of MNH. Thereafter, data was collected at MNH from July to August 2011. An informed consent form was used to facilitate voluntary participation in the study. The researchers personally administered the questionnaires, which were physically distributed to all respondents. Specific questions under each theme in the questionnaire included the following:

Theme 1: Physicians' information needs

What type of information required for your medical practices has been difficult for you to obtain?

a. Specific medical information issues.
b. Information for conducting research.
c. Information for furthering education.
d. Reference information.
e. Medical practice.
f .Others specify.
g. General medical information issues.
h. Preparation for publication.
i. Recreational activities.
j. Information for teaching.

Theme 2: Information seeking patterns of physicians

What sources do you consult to access this information?

a. Printed textbooks.
b. Printed journals.
c. Printed thesis/dissertation.
d. Friends/colleagues.
e. Others specify.

f. Electronic resources.
g. Printed technical report.
h. Medical association.
i. Printed pamphlets.
k. Personal experience.
l. Government agency.
m. Library.

Theme 3: Factors activating physicians to seek health information
What are the reasons for seeking this information?
a. Specific patent problem.
b. Preparation for publication.
c. Update knowledge about disease and new health technologies.
d. Personal interest.
e. Knowing preferred sites or text books.
f. Adequate information searching skills.
g. Others specify.

Theme 4: Barriers to information seeking
What barriers inhibit you to seek health information in your institution?
a. Personal perception towards internet information.
b. Unreliable information resources on the Internet.
c. Lack of skills on how to search health information.
d. Frequent power cuts.
e. Lack of information sharing culture.
f. Poor ICT infrastructure.
g. High cost of information services.
h. Lack of time.
i. Lack of access to a computer.
j. Others specify.

The surveys were anonymous. Aliases or pseudonyms were used in data analysis to ensure confidentiality and privacy of the study participants. All data was analyzed by using SPSS, and the results were presented by using graphs, tables and pie charts.

Results and discussions

This section presents the study findings according to the following themes: information needs, information seeking patterns, factors activating physicians to seek information, and constraints on information seeking. The profile of the respondents is also presented.

The profile of the respondents

A total of 83.0 percent (n=215) out of 259 physicians responded to the questionnaire at MNH. Male physicians were 69 percent (n=148), while female physicians were 31 percent (n=67). There was a slight difference on the

response rates between sexes where male physicians constituted 86 percent out of 190 male physicians at MNH and female physicians 78 percent out of 86. Further, the study findings showed that most respondents were aged between 21 and 30, (51.2 percent: n=110), followed by those respondents with ages 31–40, (40 percent: n=86), and those of ages 41–50, (7 percent: n=15). Few respondents were aged above 51 years (1.9 percent: n=4). Most of the respondents had a Doctor of Medicine degree (80.2 percent: n=162), followed by those with Masters of Medicine (19.8 percent: n=40), Doctor of Dentistry degree (4.7 percent: n=10) and PhDs (1.4 percent: n=3). Almost half of the respondents used modems in their laptops to connect to the Internet both at work and at home (40.7 percent: n=80) (see Table 1). Similar observations were reported in South Africa, that most health practitioners accessed the Internet from home as compared to their work places (Masters 2008). Although using a modem is expensive because the connectivity is charged per minute, its Internet connectivity is better than that at the physicians' work places. Further, most physicians find more time to use the Internet at home rather than at work. This method of access seems to encourage physicians to access the Internet at home.

Table 1: Profile of the respondents (n =215)

		Frequencies	Percentages
Gender	Male	148	68.8
	female	67	31.2
Age	21–30	110	51.2
	31-40	86	40.0
	41–50	15	7.0
	51+	4	1.9
Qualification	Doctor of Medicine	162	80.2
	Masters of Medicine	40	19.8
	Doctor of Dentistry	10	4.7
	PhD	3	1.4
Use of Internet	Use of modems in my laptop to connect to the Internet both at work and at home	80	40.7
	Accessed the Internet at home	75	34.9
	Accessed the Internet at work	57	26.5
	Accessed the Internet cafés	23	10.7

Physicians' information needs

It is very important to identify the information needs of the physicians, since "if there is no expressed information need, there is no driving force to undertake a literature search" (Davies 2007). The study findings showed that, while information is needed for all areas of health care services, physicians mainly wanted information on specific medical issues (75.9 percent: n=161) (see Table 2). Information for research purposes, and recreational activities was regarded as less important. It is obvious that physicians' information needs of the present study were related to their professional responsibilities and individual characteristics as indicated in the literature (Bryant 2004).

Table 2: Information needs among physicians at MNH (N=212)

Information Needs	Frequencies	Percentages
Specific medical issues	161	75.9
General medical issues	65	30.7
Medical practice	65	30.7
Information for teaching	62	29.2
Reference information	60	28.3
Information for furthering education	56	26.4
Information for research purposes	39	18.4
Recreational activities	21	9.9

The results of the present study further showed that a need for information related to the care of individual patients was the prevailing factor that prompted physicians to search for information at MNH, rather than information for research and further education purposes. These results were also similar to findings from other studies of physicians' information needs in Spain (Gonzalez-Gonzalez et al. 2007), the United Kingdom (Bryant 2004), and a review of information needs research (1996–2006) (Davies 2007), which showed that clinical and administrative issues (such as treatment or therapy, diagnosis and drug therapy/information) were the major information needs of physicians. However, other types of information needs (such as research and further education) may be important in enabling physicians to improve the provision of their patient care services.

Information seeking patterns of physicians

Information seeking behaviour emanates from the recognition that one's state of mind is inadequate to solve a certain problem. In this study, it was established that there were several gaps in physicians' knowledge that prevented them from addressing various problems at their work places. In order to fulfil these information needs, it was determined that physicians used numerous sources to seek information. Overwhelmingly, physicians sought information from the formal sources of information, where printed text books (75.8 percent: n=163) remained the preferred information resources, followed by electronic resources (49.3 percent: n=106) and printed journals (32.6 percent: n = 70) (see Table 3). These findings confirmed results from previous studies that printed sources were the primary information sources used by physicians (Davies 2007; Gonzalez-Gonzalez et al. 2007; Kapiriri and Bondy 2006; Ocheibi and Buba 2003). It was clear that electronic resources were also important sources of information to physicians due to the enormous amount of information and large numbers of publications that are added on the Internet daily. These findings were consistent with previous studies that physicians select information sources due to convenience and availability more than other criteria (Gonzalez-Gonzalez et al. 2007). This result is also consistent with what the Wilson (1996) model notes, that source characteristics can influence how physicians seek information. The findings of the present study further showed that 'friends/colleagues', 'medical

association', and 'libraries' constituted important sources, as mentioned by 28.4 percent (n = 61), 23.3 percent (n = 50) and 21.9 percent (n=47) of respondents, respectively. The study findings correspond with Wilson's (1996) model that users may seek information from formal or informal information sources, although informal sources had low responses in this study.

Table 3: Information seeking patterns of physicians (N=215)

Information Sources	Frequencies	Percentages
Printed text books	163	75.8
Electronic resources	106	49.3
Friends/colleagues	61	28.4
Printed journals	70	32.6
Medical association	50	23.3
Library	47	21.9
Personal experience	33	15.3
Printed Thesis/dissertation	25	11.6
Printed pamphlets	19	8.8
Printed technical reports	17	7.9
Printed newspapers	10	4.7

The study further assessed the extent to which electronic resources were used by physicians for prescribing various drugs and diagnosis. A total of 210 physicians responded to this inquiry. The findings showed that e-resources were used at a low rate for prescribing treatment and diagnosis (See Table 4). Very few physicians used e-resources every time they prescribed drugs (2.4 percent: n=5), while 3.8 percent (n=8) used e-resources when negotiating a course of action on special patient cases. Most physicians relied on their personal knowledge for patient care. E-resources were probably not frequently used during and after a consultation because the Internet was only available in 40.7 percent of the physician's offices.

Table 4: Use of E-resources for prescribing various drugs and diagnosis (N=210)

Use of E-resources for prescribing various drugs and diagnosis	Frequencies	Percentages
Every time I prescribe the drug	5	2.4
Very rarely I use e-resources for prescribing drugs and diagnosis	71	33.8
when not familiar with the drug	52	24.8
When got difficult situation in diagnosis	48	22.9
When negotiating a course of action on special patient case	8	3.8
I do not use e-resources at all	26	12.4

On the use of the Internet to search information, the study findings showed that Google (83.1 percent: n=177) was the most popular search engine used by

physicians to access information, followed by PubMed database (38.5 percent: n=82) (See Table 5). The study findings confirmed Flynn and McGuinness (2011) results that Google was the major search engine used by physicians for patient care. Similarly, Google search engine was the most commonly used website by health practitioners in South Africa (Masters 2008). It seems that physicians prefer to use a certain information source according to its accessibility rather than the quality of the sources (Gonzalez-Gonzalez et al. 2007).

Table 5: Use of the Internet to search information

Internet Sources	Frequencies	Percentages
Google	177	83.1
Pubmed database	82	38.5
HINARI database	63	29.6
Medline	53	24.9
Yahoo	33	15.5
Drug info net	31	14.6
Popline	2	0.9

Factors activating physicians to seek information

A number of factors were found to prompt physicians into searching for information. In this study, physicians sought information mainly to update their knowledge on disease and new health technologies (82.8 percent: n=178), followed by 48.4 percent (n=104) who sought information to solve specific patient problems (see Table 6). The same trend as that of the previous section on information needs emerged here that few physicians sought information for research purposes mainly because publications are not recognized as being part of their promotion criteria at their institution. The study findings confirmed Ocheibi and Buba's (2003) results in Nigeria that medical doctors mainly sought information "to keep with current development". It is clear from the present study that physicians sought information to update their knowledge and solve patient problems.

Table 6: Reasons for motivating Physicians to seek information (N=215)

Reasons	Frequencies	Percentages
Update knowledge about disease and new health technologies	178	82.8
Specific patient problem	104	48.4
Knowing preferred sites or text books	44	20.5
Adequate information searching skills	27	12.6
Personal interest	47	21.9
Preparation for publication	15	7.0

Barriers to information seeking

Although physicians faced various barriers when seeking information, the major constraints that they faced were related to poor ICT infrastructure (71.2 percent: n=153), followed by lack of access to a computer (36.7 percent: n=79), frequent power cuts (34.9 percent: n=75) and lack of time (32.1 percent: n=69) (see Table 7). Barriers such as lack of an information sharing culture, and lack of information searching skills had low responses. Although the present findings showed that information literacy skills were not a major barrier to information seeking, this finding is contrary to the results in the previous studies. A systematic review by Davies (2007) revealed that issues with ICTs, time, skills, and irrelevant content were the major barriers that limited doctors from searching information in the electronic environment. Similar findings were also reported in Ireland (Flynn and McGuinness 2011).

These barriers from the present study may fall within the categories identified by Ikoja-Odongo and Mostert (2006), namely internal (personal) and external or environmental variables. According to the Wilson (1996) model, environmental factors, source characteristics, and financial factors were the major barriers that inhibited physicians to seek information at MNH.

Table 7: Barriers to information seeking (N=215)

Factors	Frequencies	Percentages
Poor ICT infrastructure	153	71.2
Lack of computer	79	36.7
Frequent power cuts	75	34.9
Lack of time	69	32.1
Irrelevant content on the internet	41	19.1
High cost of information services	30	14.0
Lack of skills on how to search information	24	11.2
Lack of information sharing culture	10	4.7

Conclusions and recommendations

The study established that the greatest information need of physicians was to update their knowledge on disease and new health technologies. Physicians needed specific medical information to enhance their knowledge on a daily basis, in particular they needed information on patient care, rather than information for research and further education purposes. Physicians mainly made use of formal sources of information, which included printed textbooks, electronic resources and printed journals. Other sources such as friends/colleagues, medical associations and libraries were important sources of information to physicians. However, there was low use of e-resources for prescribing various drugs and diagnosis at MNH. While it is important to satisfy the information needs of physicians at MNH, there still exist barriers. Factors such as the poor ICT infrastructure, followed by lack of access to a computer, frequent power cuts and lack of time were the major barriers that inhibited physicians to seek information at MNH. Based on these findings, this study recommends the following:

1. The policies at MNH should promote information literacy skills among physicians for effective medical practices.
2. The management at MNH should improve the ICT infrastructure, by increasing the numbers of computers, and strengthening the network infrastructure to improve access and use Internet services for medical practitioners.
3. Since MNH does not have a library, the management at MNH should establish information centres or a library to enhance access to both electronic and printed information resources. This library should regularly provide information literacy training to physicians for effective medical practices. This library should also create awareness of the available information sources, and promote a culture of learning and sharing (such as communities of practice) to enable physicians to consult each other in case of problems.
4. The management at MNH need to ensure that the use of internet and e-resources for patient care is accommodated more effectively within clinicians' working hours.
5. The government should improve the supply of reliable electricity at MNH for effective medical practices.

This study did not examine the information behaviour of physicians in other types of health facilities including private, faith based and all government health facilities, both in rural and urban areas. It is recommended therefore that further studies should be undertaken to explore the information seeking behaviour of physicians in other types of health facilities. Further studies should also explore physicians' actual use of specific electronic resources during consultation and afterwards, in order to establish the extent to which e-resources are used for patient care services.

Study limitations

The scope of the study was restricted to the physicians working at the Muhimbili National Hospital (MNH) in Tanzania. MNH was selected due to its status as a national referral hospital in the country, and the existence of a good ICT infrastructure in terms of computers and connectivity, etc. The study was also restricted to physicians working in one institution due to lack of funds and time to conduct a cross-sectional study across a number of institutions. This study is based on self-reports by physicians, and thus further research needs to be done to determine the actual use of e-resources for patient care services. A longitudinal field study with a selected group of physicians would be an excellent follow up to this line of research.

References

Bryant, SL (2004) The information needs and information seeking behaviour of family doctors. *Health Information and Libraries Journal* 21(2): 84–93.

Callen JL, Buyankhishig B and McIntosh JH (2008) Clinical information sources used by hospital doctors in Mongolia. *International Journal of Medical Informatics* 77:249-255.

Case DO (2002) *Looking for information: A survey of research on information seeking, needs, and behaviour.* San Diego, CA: Academic Press.

Case DO, Andrews JE, Johnson JD and Allard SL (2005) Avoiding versus seeking: the relationship of information seeking to avoidance, blunting, coping, dissonance, and related concepts. *Journal of the Medical Library Association* 93(3):353.

Coumou HCH and Meijman FJ (2006) How do primary care physicians seek answers to clinical questions? a literature review. *Journal of the Medical Library Association* 94(1):55-60.

Davies K (2007) The information-seeking behaviour of doctors: a review of the evidence. *Health Information and Libraries Journal* 24(2):78–94.

Flynn MG and McGuinness C (2011) Hospital clinicians' information behaviour and attitudes towards the "Clinical Informationist": an Irish survey. *Health Information and Libraries Journal* 28(1): 23–32.

Gonzalez-Gonzalez AI, Dawes M, Sanchez-Mateos J, Riesgo-Fuertes R, Escortell-Mayor E, Sanz-Cuesta T and Hernandez-Fernandez T (2007). Information needs and information-seeking behaviour of primary care physicians. *Annals of Family Medicine* 5(4): 345-352.

Hofmans-Okkes I, Meyboom-de Jong B, Lamberts H, and Van Weel C (1994) *Chronisch zieken met zeldzame ziekten in de huisartspraktijk. NCCZ-reeks Zorg, opvang en begeleiding van chronisch zieken.* Zoetermeer.

Ikoja-Odongo R and Mostert J (2006) Information seeking behaviour: a conceptual framework. *South African Journal of Library and Information Science* 72(3):145-158.

Jackson R, Baird W, Davis-Reynolds L, Smith C, Blackburn S and Allsebrook J (2007) The information requirements and information-seeking behaviours of health and social care professionals providing care to children with health care needs: a pilot study. *Health Information and Libraries Journal* 24(2):95–102.

Kale R (1994) Health information for the developing world. *British Medical Journal* 309(6959):939-942.

Kapiriri L and Bondy SJ (2006) Health practitioners' and health planners' information needs and seeking behavior for decision making in Uganda. *International Journal of Medical Informatics* 75(10-11):714–721.

Katikireddi SV (2004) HINARI: bridging the global information divide. *British Medical Journal* 328(7449):1190-1193.

Krikelas J (1983) Information-seeking behaviour: patterns and concepts. *Drexel Library Quarterly* 19(2):5-20.

Kuhlthau CC (1991) Inside the search process: information seeking from the user's perspective. *Journal of the American Society for Information Science* 42(5): 361–371.

Lambert SD and Loiselle CG (2007) Health information seeking behaviour. *Qualitative Health Research* 17(8): 1006–1019.

Lwoga ET and Matovelo DS (2005) An assessment of the role of TV broadcasting in dissemination of health information in Tanzania. *Tanzania Journal of Health Research* 7(2): 98–103.

Lwoga ET: Ngulube P and Stilwell P (2010) Information needs and information seeking behaviour of small-scale farmers in Tanzania. *Innovation* 40: 82 - 103.

Martinez-Silveira MS and Oddone N (2008) Information-seeking behaviour of medical residents in clinical practice in Bahia, Brazil. *Journal of the Medical Library Association JMLA* 96(4):381-384.

Masters K (2008) For what purpose and reasons do doctors use the Internet: a systematic review. *International Journal of Medical Informatics* 77(1):4–16.

Niederdeppe J, Hornik RC, Kelly BJ, Frosch DL, Romantan A, Stevens RS, Barg FK, Weiner JL and Schwartz JS (2007) Examining the dimensions of cancer-related information scanning and seeking behaviour. *Health Communication* 22:153–167.

Ocheibi JA and Buba A (2003) Information needs and information gathering behaviour of medical doctors in Maiduguri, Nigeria. *Journal of Education Media and Library Sciences* 40(4): 417-427.

Rees CE and Bath PA (2001) Information-seeking behaviours of women with breast cancer. *Oncology Nursing Forum* 28(5):899-907.

Revere D, Turner AM, Madhavan A, Rambo N, Bugni PF, Kimball AM and Fuller SS (2007) Understanding the information needs of public health practitioners: a literature review to inform design of an interactive digital knowledge management system. *Journal of Biomedical Informatics* 40(4):410-421.

Tumwikirize WA, Ogwal-Okeng, JW, Vernby A, Anokbonggo WW, Gustafsson LL and Lundborg CL (2009) Access and use of medicines information sources by physicians in public hospitals in Uganda: a cross-sectional survey. *African Health Sciences* 8(4):220–226.

United Republic of Tanzania (2002) *2002 Population and housing census.* Available at: http://www.tanzania.go.tz/census/regions.htm.

Verhoeven AA, Boerma EJ and Meyboom-de Jong B (1995) Use of information sources by family physicians: a literature survey. *Bulletin of the Medical Library Association* 83(1):85-90.

Weitzman M and Shiffman RN (2001) Information technology and the future of child health care: a revolution is occurring. *Archives of Paediatrics and Adolescent Medicine* 155:990-991.

Wilson TD (2000) Human information behaviour. *Informing Science* 3(2):49–56.

Wilson TD and Walsh C (1996) *Information behaviour, an interdisciplinary perspective.* Sheffield: University of Sheffield, Department of Information Studies. Available at: http://informationr.net/tdw/publ/infbehav/ .

Wilson TD (1999) Models in information behaviour research. *Journal of Documentation* 55(3):249–270.

Wilson TD (1981) On user studies and information needs. *Journal of Documentation* 37(1):3–15.

Woolf SH and Benson DA (1989) The medical information needs of internists and paediatricians at an academic medical centre. *Bulletin of the Medical Library Association* 77(4):372-380.

Wyatt JC and Sullivan F (2005) ABC of health informatics: what is health information? *British Medical Journal* 331(7516): 566–568.

Younger P (2010) Internet based information seeking behaviour amongst doctors and nurses: a short review of the literature. *Health Information and Libraries Journal* 27(1):2-10.

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