
This item was submitted to [Loughborough's Research Repository](#) by the author.
Items in Figshare are protected by copyright, with all rights reserved, unless otherwise indicated.

Healthcare personnel's use of e-information sources in Riyadh governmental hospitals

PLEASE CITE THE PUBLISHED VERSION

PUBLISHER

© Sage Publications in association with Chartered Institute of Library and Information Professionals

LICENCE

CC BY-NC-ND 4.0

REPOSITORY RECORD

Khudair, Ahmad A., and Louise Cooke. 2019. "Healthcare Personnel's Use of E-information Sources in Riyadh Governmental Hospitals". figshare. <https://hdl.handle.net/2134/3582>.

This item was submitted to Loughborough's Institutional Repository by the author and is made available under the following Creative Commons Licence conditions.



creative commons
COMMONS DEED

Attribution-NonCommercial-NoDerivs 2.5

You are free:

- to copy, distribute, display, and perform the work

Under the following conditions:

 **Attribution.** You must attribute the work in the manner specified by the author or licensor.

 **Noncommercial.** You may not use this work for commercial purposes.

 **No Derivative Works.** You may not alter, transform, or build upon this work.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

Your fair use and other rights are in no way affected by the above.

This is a human-readable summary of the [Legal Code \(the full license\)](#).

[Disclaimer](#) 

For the full text of this licence, please go to:
<http://creativecommons.org/licenses/by-nc-nd/2.5/>

Healthcare personnel's use of e-information sources in Riyadh Government Hospitals.

Dr Ahmad A. Khudair is Assistant Professor of Information Science at King Saud University, Riyadh, Saudi Arabia. He completed his PhD at City University, London. His research interests include health informatics and information literacy.

Contact details:

King Saud University,

P.O. Box 17965

Riyadh 11494

Saudi Arabia

Email: khudair@yahoo.com

Dr Louise Cooke is Lecturer in Information & Knowledge Management in the Department of Information Science at Loughborough University. Her research interests include knowledge sharing in public sector organisations, and regulatory and social aspects of Information and Communications Technologies.

Contact details:

Dept. of Information Science,

Loughborough University,

Loughborough,

Leicestershire, LE11 2HX

UK

Email: l.cooke@lboro.ac.uk

Note: This study was completed with the sponsorship of King Saud University.

Abstract:

ICT has enabled a wide dissemination of information and a sharp increase in the magnitude of electronic information sources. The use of e-information sources by healthcare personnel within Saudi Arabia has received little research attention. This paper discusses the use of e-information sources by healthcare personnel in the kingdom. A questionnaire with open-ended questions was designed to collect data from eleven governmental hospitals and health centres in Riyadh. It identified a range of problems and obstacles that impact on the use of electronic information sources. The identification of these difficulties opens the way for development and improvement of the current situation.

Keywords:

Electronic information sources; Internet; Health sciences libraries; Saudi Arabia; Information literacy.

Introduction:

Many studies demonstrate conclusively that the use of appropriate information sources results in significantly better patient outcomes and fewer medical errors (Marshall, 1992; Ali, 2000; Brenneise and Marks, 2001; Peterson and Harris, 2002) and has a significant impact on physicians' practice of medicine (King, 1987; Marshall, 1992; Breton, 1994; Urquhart, 1995; Oduwale, 1999; Ali, 2000; O'Connor, 2002; Peterson and Harris, 2002; Dalrymple, 2003). The effect of e-information on healthcare professions continues to grow as professionals within the healthcare environment come to recognise it as an important source of information that enables them to be up-to-date on recent advances in their specialisms.

However, the use of e-information sources by healthcare personnel within the context of health sciences libraries has received little attention in research. Furthermore, previous investigations of e-information sources in the healthcare environment have focused on physicians only as a group in the healthcare environment. The current study explored the use of e-information sources in governmental hospitals in Riyadh by a wider range of health personnel, and investigated their perceptions of Internet use. The research attempted to identify the type of information sources used by health personnel, which of those sources meet their needs and what barriers to use they experience.

Background:

In a relatively short period of time, electronic resources have expanded to include an overwhelming amount of information. Bryson (1997), Fecko (1997) and Watts and

Ibegbulam (2006) highlight the importance of enabling users to gain access to and use the specific information that they need. The emphasis is very much on access to specialised information rather than to archives or holdings (Reid and Foster, 2000). The first exploratory stage in the Michigan Virtual Health Library identified the necessity of accessing electronic resources that provide fast, affordable, high quality, simple and reliable information (Brenneise and Marks, 2001). The modern library is more likely to act as an access interface to the global wealth of information (Brophy, 2000; Rehman and Ramzy, 2004). Atkinson (1996) argues that the role of the library is to control a systematically selected subset of published information, and then to ensure that such a subset remains stable and accessible over time. In addition, Itayem (2001) comments that ICT offers potential for increasing the range, relevance and accessibility of information and communication in health libraries.

Indeed, the most significant channel for change in health information provision has been the development of ICT (Lancaster, 2000; Lenz and Reichert, 2007). ICT plays an ever increasing role in all organisations, and libraries are no exception (Lavagnino, 1998). Cummings (2002) describes ICT as reducing isolation, facilitating international co-operation and providing access to vast amounts of information. Furthermore, Fors and Moreno (2002) note that ICT has enabled larger amounts of information to be circulated with higher speed but at lower costs. ICT has become an important element in the working life of any healthcare service, and there has been a sharp increase in the amount of clinical information due to the use of advanced measurement technology (Hughes et al., 2002; Lenz and Reichert, 2007).

The Internet is a unique information medium allowing information to be accessed at any time from anywhere in the world. Fraser et al. (1997) note its potential as a tool to facilitate access to an enormous amount of information. Pallen (1995) comments that the Internet is a feasible source of medical and scientific information for physicians. Jacko et al. (2001), Khudair and Bawden (2004) and Khudair (2005) express the view that health personnel are enthusiastic to use the Internet for easy to use, fast communication features and to provide current and relevant information, in a timely manner, from a multitude of sources. In addition, the vastness and diversity of the Internet make it an ideal choice as both an information repository and a dissemination mechanism for healthcare-related information (Marra et al., 1996). A number of papers discuss electronic information retrieval systems with particular emphasis on the use of the Internet in clinical practice (Hersh and Hickam, 1998; Lindberg and Humphreys, 1998; McDonald et al., 1998; Peters and Sikorski, 1998). They conclude that healthcare professionals acknowledge the key role of the Internet as an interactive research and communication tool for the medical profession. Podichetty et al (2006) confirm that the Internet and web-based health electronic information sources are commonly used among health professionals.

O'Connor (2002) highlights the barrier posed by the complex information needs of doctors. Dorsch and Landwirth (1994), Dorsch and Pifalo (1997), Young (1999), Rehman and Ramzy (2004) and Khudair (2005) suggest that the major obstacle to the potential influence of information resources is the barrier of accessing and use of online databases to support decision-making. In fact, many users have limited IT skills, and have difficulties in finding time and confidence. This unease is being exacerbated by the fact that many users perceive computers as irrelevant to their

professional training (Garrod, 2001; Adams and Blandford, 2002). The importance of educating and training users of information sources is apparent, particularly in the use of technology that enables them to access and use biomedical literature (Lindberg et al. 1993; Khalid, 2000; Renwick, 2005; Watts and Ibegbulam, 2006) and to provide opportunities to make effective, efficient and independent use of information resources and services (Lindberg et al. 1993; Haynes et al. 1994; Khalid, 2000; Rehman and Ramzy, 2004).

The advent of information technologies in healthcare fields has undoubtedly facilitated and helped to ease healthcare management. However, healthcare professionals continue to face the daunting task of remaining fully informed of advances in their disciplines (Hersh and Hickam 1998; Watts and Ibegbulam, 2006). Knowledge diffusion to healthcare professionals has been inhibited by the difficulty of accessing up-to-date information, ignorance of the availability of information, the lack of time available to acquire information, and poorly organized information (Detmer and Shortliffe, 1997; Rehman and Ramzy, 2004; Khudair, 2005; LaPelle et al., 2006).

In the Arab region there is not much accessible literature that discusses the topic. It is true that ICT infrastructure has improved dramatically in the last few years. Al-Shorbaji and Nour (2001) report that all Eastern Mediterranean Region (EMR) countries are now connected to the Internet, and the number of trained computer and communication specialists has substantially increased. In addition, they note that health libraries are in a better situation than many other types of libraries. However, it is important to note that Al-Shorbaji and Nour's research highlights the fact that the

vast majority of health libraries are controlled, managed and administered centrally (ibid.). Central administrators' opinion, attitudes and wariness of ICT have a direct and indirect impact on the decision-making in favour of ICT implementation and upgrading.

Siddiqui (1996) notes that all types of libraries in Saudi Arabia are using GULFNET as the Internet Service Provider (ISP) to communicate with each other. Some other writers suggest that health libraries might be rated as very good in terms of their collections, services, and use of ICTs with comparison to other type of libraries in the country (Dosary and Ekrish, 1991; Al-Ogla, 1998; Arif, et al. 1998). Nonetheless, Khalid (2000) notes that the use of technology in libraries in Saudi Arabia is lower than that in developed countries such as the UK, and that in less developed countries such as Malaysia.

AbuOuf (1995) studied physicians' use of information resources in hospital libraries in Jeddah. She found that hospital libraries contain basic resources, and that physicians widely receive specialised medical and professional literature as members of scientific societies, medical associations and specialised organisations. They use these resources as well as library resources for carrying out medical research. In another research study conducted in Jeddah, Aseel (1996) studied the use of the MEDLINE bibliographic medical database on CD-ROM by the physicians of three hospitals. Aseel found that all the hospitals' libraries publicised the service when it first started. As a result of this publicising, half of the physicians used the MEDLINE database. However, none of the hospital libraries provides training programmes to

instruct the physicians on how to use the database, thus minimising their use of MEDLINE databases on CD-ROM.

In a study carried out in Najraan General Hospital, Khan and Khan (2001) describe using the Internet and medical surfing as fast becoming part of a doctor's profession, but nevertheless they observed that techniques for browsing the Internet and retrieving useful information from myriads of medical websites seem like a daunting task to many. They suggest that the Internet will soon become a universal library and, importantly, medical surfing should be included in the curriculum of all medical schools and universities. Alshaya (2002) found two major problems: the lack of information sources provided by health libraries in Riyadh to physicians; and inadequate information education for physicians. Alshaya recommends extending physicians' access to electronic information sources, and enhancing information education opportunities for physicians.

Methods and sampling:

This study explores the use of e-information sources by health personnel working in governmental hospitals in Riyadh. Its main purpose was to gather both quantitative and qualitative data in order to gain accurate knowledge of current activities. The study used a questionnaire as an information gathering technique. A qualitative approach was used side-by-side with a quantitative approach by using open-ended questions to collect answers, and to give each respondent the opportunity to comment on those questions. The intention of the open-ended questions was to validate the research results and findings from the quantitative questions in the questionnaire.

In order to select an appropriate research sample, the following method was used to determine the population of the study:

- 1- Define the target population. This study was devised with very specific inclusion criteria that outlined the geographic and clinical characteristics of the desired population. For example, the study was to include all governmental hospitals located in Riyadh.
- 2- Exclusion criteria were developed. These applied to hospitals that meet, generally, the inclusion criteria, but that had to be excluded because they could not complete the study or possessed unique characteristics that could confound the results. For example, an exclusion criterion is any hospital that does not have a health sciences library.
- 3- Define a sampling process and specific technique for recruitment. Dynamic recruitment has to ensure a large enough sample to enable validity, but minimise the probability of error and bias.

Using the inclusion and exclusion criteria, 11 hospitals were defined as governmental hospitals located in Riyadh the capital city of Saudi Arabia. Therefore the research involved the following hospitals:

1. King Khalid University Hospital (KKUH)
2. King AbdulAziz University Hospital (KAUH) and College of Dentistry (CD)
3. Riyadh Armed Forces Hospital (RAFH)
4. King Fahd National Guard Hospital, later known as King AbdulAziz City of Medicine (KACM)
5. King Faisal Specialist Hospital and Research Centre (KFSH/RC)
6. King Khalid Specialist Eye Hospital (KKSEH)

7. Security Forces Hospital (SFH)
8. Yamamah Hospital (Yamamah)
9. Sulaimaniyah Children Hospital (SCH)
10. Saudi Center for Organs Transplant (SCOT)
11. Al-Iman General Hospital (IGH)

A total (n=493 of 845) of 58.3% of the questionnaires that were distributed were completed and returned. The number of returned questionnaires is an adequately large sample to allow for some degree of generalisation. This rate is considerably higher than the average for postal questionnaires. Denscombe (2003) confirms that a response rate of 10-15% is not unusual for a large-scale postal questionnaire. He also notes that there is no single agreed 'acceptable' response rate, as this will “depend on the methods being used, the nature of the respondents, the sample size, and the type of issues being investigated” (Denscombe, 2003, p.20).

The category of health personnel in this study is as follow: physicians n=193 (39.1%), nurses n=117 (23.7%), medical technicians n=37 (7.5%), paramedical personnel n=15 (3.0%), and pharmacists n=12 (12.5%). A considerable number of respondents n=105 (21.3%) is noted for *other*; many respondents choosing *other* indicated they were in fact computer staff (n=3), administrators (n= 14), or visiting staff and students (n=88). Fourteen respondents (2.9%) did not specify their job category. The number of male respondents to the questionnaires was 271 (55%), while there were 217 (44%) female respondents.

Findings:

In this paper findings on the following issues are presented: seeking information, visiting health sciences libraries, information needs, Internet use, electronic services, and learning and training.

1- Seeking Information

Table 1 shows seven sources to which the user can refer in order to gain a specific piece of information. The most used source was the health sciences library (45%) as the first choice for users to get the information they needed, followed by private online searches (25.8%). The least used was specialist meetings (0.8%).

[Insert Table 1]

This result shows that health personnel are consulting health sciences libraries first to seek information. The health library is of great value to users in the field of medicine; however, some health personnel indicated that an online search is beneficial, facilitated through the health libraries or through private connectivity and access. Looking at respondents' views according to hospitals, the highest number of health personnel consult and visit the health sciences library for their information needs, apart from personnel in SCOT and KFSH/RC. Health personnel in both these bodies referred to online searches as their number one priority for seeking information. The KFSH/RC and SCOT make the Internet and other information sources accessible from all departments and most offices.

Table 2 lists purposes of visiting the health library. Visiting for reading material was cited by 39.6% of the respondents, followed by borrowing material (25.1%). Photocopying was the least cited purpose (11.2%).

[Insert Table 2]

Health personnel in IGH, KAUH/CD, KKESH, SCH, SCOT, KKAUH and SFH mostly visit their health sciences library for the purpose of reading materials, while the majority of health personnel in KACM, KFSH/RC and Yamamah visit their health sciences library for the purpose of borrowing materials. In RAFH, the main purpose of visits was to carry out a literature search. Female respondents in the KAUH/CD, and SCH used the health libraries in general and for reading materials more than males. KAUH/CD and SCH have special places for reading for female users which make it more convenient for them. In contrast, in KKESH female users would rather use the health library for carrying out literature searches and for borrowing materials rather than for the purpose of reading. The library not only lacks special places designed for female readers but also lacks reading space for general users. Therefore, many users in the KKESH, especially female respondents, wished for a proper designated reading area. Nevertheless, the functions of reading, borrowing and literature searching are shown as the main reasons to visit and use any library, since these are a major part of its services.

2- Visiting Health Science Libraries

A small majority of respondents (52.1%) reported that they did not face difficulties in accessing the health sciences library, whereas 45.0% of users did face some difficulties which constrained them from gaining access. There were some difficulties

which faced these users on a regular basis and prevented them from making greater use of their health sciences library. Inevitably, there will be some difficulties which are of varying importance, but this high percentage gives a negative impression regarding the health libraries in Riyadh and their efforts to reduce the difficulties.

Table 3 shows that 22.0% of respondents referred to the 'opening hours' as giving the greatest difficulty, whilst 18.9% referred to the library's collection, as it did not fulfil their needs i.e. 'There are not enough resources'. The location of the library in the hospital was cited as a difficulty by more than 16.7%. In addition, 24.3% indicated that they face 'Other' difficulties. One of these difficulties is the workload they have in the hospital, as is confirmed by Al-Ghamdi (2002), AlShaya (2002) and Rehman and Ramzy (2004).

[Insert Table 3]

Respondents stated that their workload was high and they could not contact the health library on a regular basis during current opening hours. The problem of opening hours reduced the utilisation by health personnel of health sciences libraries services since most of these services such as reading, borrowing and literature searching can be accomplished only while the library is open. Many health personnel expressed the need for the health sciences library to offer its services 24 hours a day to respond to important needs and to be available for consultation in the healthcare environment. This would increase their possibility of using the information sources and reduce the effect of heavy workloads preventing health professionals from using the health sciences libraries.

3- Information needs

Analysis revealed that respondents working in the healthcare environment look for information to meet different needs. Respondents reported the purpose of obtaining information during their work as shown in Table 4. The need to keep up-to-date with knowledge (44.4%) was the most frequently cited purpose, followed by the need for information for clinical work (31.2%). Respondents who searched for information for writing a paper were as few as 7.5%, while ‘examinations’ accounted for 5.1%, and ‘teaching’ 4.9%.

[Insert Table 4]

Respondents’ job description was found to be significantly associated with their information needs, using a Chi-square test. Categories in this section were reduced for the purposes of cross-tabulation; the needs for information *for clinical work* and *to keep up-to-date*, were grouped to form *clinical and up-date*, while information for *teaching, examination, and writing*, were all grouped to form *education and research*. The result ($\chi^2 = 12.39$, $df = 2$, $N = 459$, $p < .002$) showed that nurses’ need for information for clinical and up-date was greater than physicians’ need, while the need for information for education and research was higher for physicians than for nurses. Other reasons to search for information were reported by health personnel, such as the need for information to give help, to support patients, and to make and finalise clinical decisions.

4- Internet use

The Internet provides easy access to a huge volume of information. The investigation in relation to the Internet was intended to explore specifically the healthcare personnel's use of the Internet, and covers the following:

- 1) Regularity of Internet use.
- 2) Place of Internet access.
- 3) Rating of information obtained with an Internet search.
- 4) Internet in comparison with information search tools

The findings indicate that the majority of respondents (63.9%) used the Internet on a daily basis, while 35.3% did not interact with the Internet daily. Accordingly in a cross-tabulation, 73.0% of male healthcare personnel used the Internet daily, while a lower percentage of females (52.5%) used it on a daily basis. Respondents who used the Internet on a regular basis (N=315) used it to surf, and accessed it in places other than health sciences libraries. The majority of respondents (72.7%) accessed the Internet from places other than the health sciences libraries, including home, work departments, and Internet cafés, while only 25.4% of respondents accessed it from the libraries. In particular, none of the healthcare personnel in Yamamah Hospital indicated that they use the Internet in the health sciences library since their library did not have a PC and Internet connection for users. On the other hand, the majority of respondents in IGH and KKUH indicated that they used the Internet in the library more than elsewhere.

Table 5 shows that 56.0% of respondents believed they derived important information from their search on the Internet, whilst 32.0% of respondents believed that the

information obtained was fairly important, and only 4.1% generated unimportant information. Statistically, based on the results in Table 5, the median rating of information generated from the Internet by users in the healthcare environment was 'important'.

[Insert Table 5]

In comparison between the use of the Internet and other information search tools, the majority of respondents (69.8%) preferred to use and access the Internet for their information search, as shown in Table 6. This was followed by the card catalogue which only 10.5% of respondents preferred to use for their search. A very small percentage (6.1%) of respondents preferred to use electronic databases, while there were only 4.3% each who preferred to use CD-ROM and OPAC for information searching.

[Insert Table 6]

To investigate whether the preference of the use of the Internet as an information tool was related to job description, a chi-square statistic was used. Categories in this section were reduced for the purpose of cross-tabulation: *IT/IS computer staff*, *administrators*, *pharmacies*, *paramedical personnel*, and *medical technician* were all grouped together to form *other*. The result indicates that the variables are significantly associated ($\chi^2 = 7.307$, $df = 2$, $N = 478$, $p < .026$). The number of physicians who preferred the Internet as an information tool was significantly different (i.e. higher) from the number of nurses and others who preferred it.

Khudair and Bawden (2004) confirm that the features of the Internet have proven its superiority over all other types of information resources and communication tools. It can be concluded that clear preference for using the Internet as a tool for searching of information is related to the following:

- 1) It is easy to use and interact with the Internet.
- 2) It is easy to access preferred websites, electronic journals and databases.
- 3) The Internet is available in most places: libraries, office desktop, and homes.
- 4) It combines three features, as a source of information, a search tool, and a way of fast communication with the outside world.

5 - Electronic services

This section investigated respondents' preference in using the electronic services provided by the health sciences libraries. Table 7 shows that 47.6% of respondents preferred to access electronic services by themselves, while only 14.4% preferred to access them through the health library staff. A high percentage (33.3%) of respondents did not mind whether they accessed the electronic services through the health library staff or by themselves. However, some respondents indicated their expectation of libraries to provide courses related to electronic service use in order to enhance their skills and to give them confidence in their ability to use the electronic services more effectively, and to avoid seeking library staff assistance every time they need to use these services.

[Insert Table 7]

As for the value of the electronic information services to respondents, Table 8 shows that 48.9% of respondents believed that the electronic information services provided

by the health libraries were important in enabling them to acquire the information they needed, and a further 36.1% rated these services as fairly important. Only 6.7% of respondents noted that these electronic services were unimportant in relation to the fulfilment of their information needs. Furthermore, the median evaluation of e-services was important.

[Insert Table 8]

A chi-square test was used to find association between accessing of electronic services by *library staff* or *myself* and the rating of electronic information services ($\chi^2 = 4.200$, with an associated significance level of 0.04). In this case, the value is smaller than the alpha value of .05; therefore it can be concluded that this result is significant. This means that the number of users who preferred the help of library staff and rated the electronic services as important was significantly different from the proportion that preferred to use the electronic services by themselves and rated the services as important. In addition, a cross-tabulation showed that physicians gave higher ratings of importance to electronic services provided by the health libraries than others, which indicates their high appreciation of the electronic services.

6 – Learning and training

Respondents were asked to indicate their method of learning how to use electronic resources and services. The methods of learning are shown in Table 9. 34.7% of respondents learned to use electronic sources and services with the assistance of friends and colleagues, while 29.8% of respondents did so by trial and error or were 'self-taught'. Respondents who learned to use e-sources with the assistance of the

health librarian accounted for 20.2%, while 6.3% reported learning through their participation in private training courses offered outside the hospital environment.

[*Insert Table 9*]

More than half of the respondents had learned how to use the electronic sources by using trial and error, were 'self-taught', or had the assistance of friends and colleagues. Furthermore, healthcare personnel of different age groups mostly learned about the use of electronic sources with the help and assistance of friends and colleagues and through being self-taught. Analysis found gender differences in the way respondents learned to use electronic sources and services. Male healthcare personnel were more likely than females to be self-taught. On the other hand, there was little difference between the proportions of male and female healthcare personnel who consulted their friends and colleagues in the use of e-sources. Female healthcare personnel who learned to use e-sources with the assistance of health library staff were slightly greater in number than males. In addition, some people undertook private training courses. Generally, the majority of respondents learned about the electronic sources and services in the health libraries through ways other than the assistance of health library staff.

The utilisation of electronic resources and the improvement of information skills require continuous training programmes for end-users. Analysis revealed that 40.2% of respondents had received computer training, while the majority (58.8%) had not. A chi-square test was made with gender related to computer training. The value generated was $\chi^2=0.783$, with an associated significance level of 0.37. In this case, the value is larger than the alpha value of .05. Therefore it can be concluded that this

result is not significant. This means that the proportion of male healthcare personnel who did not receive computer training is not significantly different from the proportion of female healthcare personnel who did not receive it. Another chi-square test was made with physicians and nurses related to computer training. The value generated was $\chi^2=0.229$ with an associated significance level of 0.6. Again, the value is larger than the alpha value of .05, from which it can be concluded that this result is not significant. This means that the proportion of physicians who did not receive computer training is not significantly different from the proportion of nurses who did not receive it.

These results suggest that the low opportunity of computer training has no significant relation to gender or job description. As a result, the majority of healthcare personnel in Riyadh hospitals depended on their own efforts to learn to obtain ICT skills, particularly in relation to computer usage. In this matter, various respondents made comments expressing their need of computer training.

For those healthcare personnel who had received training, the duration of training was investigated. The response options were: days, weeks, months, and years. Table 10 shows that the highest percentage (38.4%) of respondents received months of training, while 33.3% received only weeks of training. 'Days' of training were reported by 18.7%, and the lowest percentage was for 'years' with 8.6%.

[Insert Table 10]

Hospitals in Riyadh offer computer-training programmes, which vary in length from days up to years. Most respondents who had received training (196 out of 198)

indicated the time period of their training programmes. In general, the diversity and length of time for training programmes did not necessarily achieve users' satisfaction. In fact, 51.0% (N=101 out of 198) of respondents who received training programmes indicated that they were not satisfied with the programme in terms of timing, length, and quality, while 48.0% (N=95 out of 198) were satisfied.

To investigate whether or not respondents' gender was related to their satisfaction level regarding training programmes offered by hospitals in Riyadh, a chi-square test was carried out. The result indicated that there was a significant association between the two variables ($\chi^2 = 4.46$, $df = 1$, $N = 194$, $p < .035$), where male respondents were more satisfied with the training programmes than females.

Respondents' job description was found, using a chi-square test, to be significantly associated with their level of satisfaction with training programmes offered by Saudi hospitals. The result indicates that there was a significant association between job description and satisfaction with training programmes; ($\chi^2 = 5.35$, $df = 1$, $N = 102$, $p < .021$), where physicians were more likely than nurses to be satisfied with training programmes.

Respondents who were not satisfied with the training programmes or courses indicated that as the training was limited to certain topics, it did not fulfil their needs. Others indicated that the programmes offered were very old and not up-to-date. Respondents, as a result of their dissatisfaction, found their own way of learning more about computers and information technologies, such as by enrolling on private training courses.

It can be concluded that health personnel mainly ascribed their dissatisfaction with the training programmes offered to poor training quality and inconvenient timing. As regards the matter of timing, some health personnel demanded frequent and up-to-date training, and to have more time to focus on training, as most of the time they were overwhelmed with their hospital workload. In line with the assumption that training would influence attitudes towards ICT, some health personnel who were satisfied with training commented that as a result of valuable and relevant training they had become more positive, and more confident in using ICT.

Discussion:

This paper presents aspects of health personnel use of ICT in the kingdom of Saudi Arabia. It identifies issues that need to be addressed if ICT is to be able to influence the information access of health personnel and to deliver recognised benefits for patient outcome. This study sample includes all health personnel groups, and it also adds further detail, and updating to existing characterizations of health personnel information needs, including the categories of information seeking, information needed, information sources, and perceived issues and limitations of access to information. Largely, this study confirmed the findings of others who have investigated health sciences libraries (AbuOuf, 1995; Aseel, 1996; AlOgla, 1998; Arif et al., 1998) and health professionals' perspective of new technology in the health environment (Al-Zahrani, 2001; AlShaya, 2002), including the need for timely health information and for access to a wide variety of types of information.

Health personnel showed their appreciation of the services and resources provided by health sciences libraries through their frequent visits and their demands for better management of services in order to facilitate such visits. However, difficulties that health personnel presented show how decision makers undermine these much needed resources and services. Although, in recent years, there has been a concern about the implication of adoption of various kinds of electronic information services into health sciences libraries, a weakness of libraries is that generally they have grown up without being carefully planned to fit in with existing facilities and information and communication technology infrastructure. Arif et al. (1998) noted that their development has been ad hoc, without proper planning or co-operation with neighbouring libraries (Arif et al., 1998).

Decision makers should realise the importance of the contribution of library and information services to institutional development. Watson (1998) and Peterson and Harris (2002) expressed the importance of a library as it supports the goals and interests of institutions in the medical and health fields through the activities of information management, information technology and learning support. With consideration of the strategic influences on library and information services over the next decade, Bryson (1997) indicates an important point, in that it requires an analysis of the factors that would create the need for change or impact upon people and organisations.

Developments and management changes that are required are those that have a direct aim of meeting the information needs of library users and disseminating information to assist people and organisations in decision making for better predicting of future

needs. In this study, the analysis revealed that health personnel in their healthcare environment seek information to meet different needs. They need accurate information resources, mainly to enable them to keep up-to-date in the field of knowledge, clinical work, and writing papers and research. The findings suggest that these information needs are not currently being met by current services and available resources. This indicates a lack of updated materials and sources available to health personnel. Indeed, this may force health personnel to spend more time searching for updated materials in other places and from alternative sources, when this time could otherwise have been utilised for the benefit of the healthcare system.

Health personnel realise the importance of both information sources and information sharing among hospitals. They have noted the need for diverse kinds of information including: research information; hospital news; new trends in treating specific diseases; patient records; and patient education. This points further to the information categories that health personnel are in need of, as well as highlighting the need for systematic collaboration and co-operation among Saudi hospitals. It can be concluded that health professionals could benefit from information sharing for two reasons:

- 1) To keep them updated with information – this is supported by their preference for seeking information mainly to keep up-to-date;
- 2) To develop a strong communication with others based on knowledge and information sharing as well as it will benefit the healthcare environment.

Sharing of information, however, is a huge task that cannot be accomplished without a well designed information policy and formal co-operation. This then leads the discussion to a related and important aspect of information access and availability. In

fact, health personnel believe their demands for more electronic resources for the health information network will improve the dissemination and accessibility of health information in the country. Availability and accessibility have an influence on the use of information in general, and electronic information sources in particular, since, as noted by Nicholas (2000), people will usually use what is easiest and closest to hand. In addition, an efficient, accessible and reasonably comprehensive information service is a vital factor to enhance the effectiveness and productivity of health personnel in various areas such as research, clinical work, and patient care. It is worth saying that the healthcare environment in Riyadh suffers from a lack of two important characteristics:

- 1 Effortless access and use of health information by health personnel;
- 2 Direct health information flow in and out of health sciences libraries.

These two characteristics will influence healthcare environment productivity, and the fact that these problems persist suggests a lack of awareness of the importance of information access and information services on the part of policy makers. This was confirmed by the fact that hospital management is not directly concerned with such matters as planning future work changes, library and information policies, and initiating personal development and change.

Health library users generally are already occupied with full-time work for which they need the support of the library, be it for clinical, research or for administrative problems. Information sources in health and medical fields are important for health professionals to keep up-to-date with new practices in medicine and for knowledge enhancement. Health sciences libraries can be supportive in encouraging users to use

the library effectively, with an awareness of how important the time factor is for users in general, and potential users in particular. However, this important task is not possible within the current level of library staffing since the majority of them are not information specialists and are not fluent with other languages such as English language. In addition, health and medical sciences are very broad in scope, which makes it very difficult for paraprofessional library staff to meet related information needs.

Bawden and Blakeman (1990), Spiegman (1997), and Marshall et al. (2002) explain that the traditional nature of special libraries and information services has been based on the design and management of services that meet the strategic information needs of the individual or group being served. Indeed, exploring, analysing and meeting these needs will play a major role in the future development of health personnel so that they can become frequently updated with knowledge of new medical developments. It is also vital for the future development of healthcare institutions so that the success of clinical work can be maintained. This exploration, analysis and meeting of identified needs will also be crucial to the development and change of library and information services and to increasing their role in of providing knowledge to health personnel such that they contribute to the successful achievement of their health institutions' mission.

The increased use of electronic information sources is significant and has become a common tool in most information search processes. The increase in the use of electronic sources can be attributed to the easy and fast accessibility to a specific piece of information that they offer, while rare or non-use of these sources and tools is

explained by frequent interruptions and complicated interfaces. The Internet has been placed as a priority search tool compared with any other electronic and other resources. The majority found that the Internet is the medium to find easy access to information and to overcome any difficulties that they might encounter in visiting the health sciences library. Khudair (2005) confirms that the features of the Internet have proven its superiority in this respect to all other types of information resources and communication tools. He further explains that the preference of health personnel for using the Internet as a tool for searching for information is related to the following: easy access and interactivity, and its combination with other features, such as a way of fast communication with the outside world. It is, nevertheless, important to note that the majority of respondents accessed the Internet in places other than the health libraries. The reason for this can be linked to:

- 1) Internet service was accessible in most hospital departments and offices;
- 2) Users' workloads in the hospital environment limited their access to and use of the Internet specifically from the health library;
- 3) The location of most of health libraries, and their opening hours, prevented users from using the library to access the Internet.

Therefore, they are interacting with the Internet on a regular basis. However, some health personnel have noted an important issue of the quality and relevance of information retrieved from their Internet search. Some of them have reported these difficulties related to the time spent in sorting quality and relevant materials that they need. Others found that the difficulty focused on their lack of ability in recognising authentic and quality materials generated from the Internet. These comments are very

important and indicate the need for continuing professional development and training which will contribute to overcoming these problems.

New technologies and developments require various information and technological skills. Garrod (2001), Rehman and Ramzy (2004), Renwick (2005), and Watts and Ibegbulam (2006) note that many users have limited ICT skills and they are in need of developing their ICT skills. In addition, training programmes for health personnel in Saudi Arabia are not currently meeting needs, as 51.0% (N=101 out of 198) of respondents who received training programmes indicated their dissatisfaction with the programme in terms of timing, length, and quality. Also, some of the dissatisfied health personnel noted the need for well designed training programmes to improve their information literacy.

Indeed, the unavailability of quality training programmes creates a condition of dissatisfaction and low accessibility and utilisation of available electronic information resources. Health personnel, generally, might not receive enough courses related to Information and Communication Technology during their formal education and schooling, and the need remains beyond this point, since access problems related to ICT skills persist. These could be avoided through further formal and informal educational and training courses. This is a lifelong process for health personnel to enhance knowledge, professional competence, and to learn to live alongside the changes and challenges of technology.

Conclusion:

It is clear that the health library should have a vision of users' education and awareness, since users are seeking information mainly to satisfy their need to keep up-to-date with new knowledge in their field of medicine. It is important that health libraries draw up a strategic plan to participate in the hospital's 'clinical practice' and to provide information sources and services based on a firm identification of the need in clinical work. The health sciences libraries and information services have an influence upon users and upon healthcare practice. It is essential for health sciences libraries to consider reviewing their position and the information services they provide and a need for a general improvement in the capabilities of staff working within those libraries.

Health personnel in Riyadh have been using new technologies mainly depending on their own ability and desire: this leads to slow adoption of electronic information-seeking behaviours and low use of available electronic information sources. Some obstacles to the use of electronic information sources have been identified including:

- Health personnel are overwhelmed with work load;
- Lack of information skills;
- Low level of information literacy and skills programmes in formal education and in the health work environment;
- Lack of information policy to ensure information access;
- Limited awareness of decision-makers of the importance of the availability, accessibility, and use of electronic information sources.

These findings encourage researchers to investigate further the information seeking and retrieval of health personal and explore more about barriers that cause the low use

of electronic information sources. It is suggested that identifying these problems and obstacles surrounding access to electronic information and use is the first step towards the realization of the need for development and change of the current situation.

References:

- AbuOuf, S. 1995, *Use of information resources by physicians in Jeddah hospital libraries*, Master of Science edn, College of Arts and Humanities, King AbdulAziz University, Jeddah.
- Adams, A. & Blandford, A. 2002, "Acceptability of medical digital libraries", *Health Informatics Journal*, vol. 8, no. 2, pp. 58-66.
- Ali, I. 2000, "Library provided information and clinical decision making: a study of two hospitals in Canberra", *Australian Academic and Research Libraries*, vol. 31, no. 1, pp. 30-45.
- Al-Ogla, S. 1998, "A study of hospital and medical libraries in Riyadh, Kingdom of Saudi Arabia", *Bull Med Libr Assoc.*, vol. 86, no. 1, pp. 57-62.
- Alshaya, A. 2002, *A study of the use of information sources, with special emphasis on CD-ROMS and the Internet, by Saudi physicians in major government hospitals in Riyadh, Saudi Arabia*, Ph.D. Thesis, University of Wales, Aberystwyth.
- Alshorbaji, N. & Nour, H. 2001, "The Eastern Mediterranean Virtual Health Sciences Library: What has been realized?", *Regional Conference on Medical Librarianship: Building the Virtual Health Sciences in the Eastern Mediterranean, 11–13 November 2001* WHO/EMRO, Teheran, Islamic Republic

of Iran. Available from: <http://www.emro.who.int/HSV/L/Presentations/Al-Shorbaji2.pdf>. [04.07.2006].

- Al-Zahrani, S. 2001, *Computer network system for university hospitals in Saudi Arabia*, PhD. Thesis, Loughborough University, Loughborough.
- Arif, M. et al. 1998, "Inter-library loan service in the Kingdom of Saudi Arabia: a case study of medical libraries", *The International Information & Library Review*, vol. 30, no. 4, pp. 341-365.
- Aseel, G. 1996, *Attitudes of physicians in the city of Jeddah Toward the use of MedLine databases on CD-ROM*, Master of Science, College of Arts and Humanities, King AbdulAziz University, Jeddah.
- Atkinson, R. 1996, "Library functions, scholarly communication, and the foundation of the digital library: laying claim to the control zone", *Library Quarterly*, vol. 66, no. 3, pp. 239-265.
- Bawden, D. & Blakeman, K. 1990, *IT strategies for information management*, Butterworths, London.
- Brenneise, H. & Marks, E. 2001, "Creating a state-wide virtual health library: the Michigan experience", *Online Information Review*, vol. 25, no. 2, pp. 115-120.
- Breton, A. 1994, "Nursing librarianship: thoughts and opinions", *New Zealand Libraries*, vol. 47, no. 12, pp. 232-234.
- Brophy, P. 2000, "Toward a generic model of information and library services in the information age", *Journal of Documentation*, vol. 56, no. 2, pp. 161-184.

- Bryson, J. 1997, *Managing information services: an integrated approach*, Gower, London.
- Cummings, S. 2002, "ICTs and international cooperation: a discussion paper", *Information Development*, vol. 18, no. 3, pp. 161-166.
- Dalrymple, P. 2003, "Improving Health Care through Information: Research Challenges for Health Sciences Librarians", *Library Trends*, vol. 51, no. 4, pp. 525-540.
- Denscombe, M. 2003, *The good research guide: for small scale social research projects*, Open University Press, Maidenhead.
- Detmer, W. & Shortliffe, E. 1997, "Using the Internet to improve knowledge diffusion in medicine", *Communications of the ACM*, vol. 40, no. 8, pp. 101.
- Dorsch, J. & Landwirth, T. 1994, "Document needs in a rural GRATEFUL MED outreach project", *Bulletin of the Medical Library Association*, vol. 82, no. 4, pp. 357-362.
- Dorsch, J. & Pifalo, V. 1997, "Information needs of rural health professionals: a retrospective use study", *Bulletin of the Medical Library Association*, vol. 85, no. 4, pp. 341-347.
- Dosary, F. & Ekrish, A. 1991, "The state of automation in selected libraries and information centres in Saudi Arabia", *Libri*, vol. 41, no. 2, pp. 109-120.
- Fecko, M. 1997, *Electronic resources: access and issues in topics in Library and Information Studies*, Bowker-Saur, London.

- Fors, M. & Moreno, A. 2002, "The benefits and obstacles of implementing ICTs strategies for development from a bottom-up approach", *Aslib Proceedings*, vol. 54, no. 3, pp. 198-206.
- Fraser, H. et al. 1997, "Using the technology of the World Wide Web to manage clinical information", *BMJ*, vol. 314, pp. 1600-1603.
- Garrod, P. 2001, "Staff training and end-user training issue within the hybrid library", *Library Management*, vol. 22, no. 1/2, pp. 30-36.
- Haynes, R. et al. 1994, "Performance of 27 Medline systems tested by searches with clinical questions", *Journal of American Medical Information Association*, vol. 1, pp. 285-295.
- Hersh, W. & Hickam, D. 1998, "How well do physicians use electronic information retrieval systems?", *Journal of the American Medical Association*, vol. 280, pp. 1347-1352.
- Hughes, K. et al. 2002, *Information and communication technology in public health tackling health and digital inequalities in the information age*, North West Public Health Observatory, Liverpool John Moores University, Liverpool.
- Itayem, A. 2001, "Health information on the Internet in Arab and Islamic countries", *Second regional conference on medical librarianship: building the virtual health sciences libraries in EMR, 11–13 November 2001* WHO/EMRO, Teheran, Islamic Republic of Iran Available from:
<http://www.emro.who.int/HSV/L/Presentations/Itayem.pdf>. [02.07.2006].

- Jacko, J. et al. 2001, "Framework for usability: healthcare professionals and the Internet", *Ergonomics*, vol. 44, no. 11, pp. 989-1007.
- Khalid, H. 2000, "The use of technology for housekeeping and bibliographic searching activities in university libraries of Saudi Arabia: the need for acceleration", *Library Review*, vol. 49, no. 4, pp. 179-185.
- Khan, L. & Khan, S. 2001, "Medical surfing", *Saudi Medical Journal*, vol. 22, no. 11, pp. 951-955.
- Khudair, A. 2005, *Health Sciences Libraries: Information Services and ICTs*, Phd Thesis, City University, London.
- Khudair, A. & Bawden, D. 2004, "Saudi Health Information Network (SHIN): A proposed Prototype", *Fourth Regional Conference on EMR Health Sciences Virtual Library: Role in e-Learning and Building the Information Society, Cairo, 23-25 November 2004* WHO/EMRO, Available from:
<http://www.emro.who.int/HIS/vhsl/conferences/vhsl4-abstracts.htm>.
[01.02.2005].
- King, D. 1987, "The contribution of hospital library information services to clinical care: a study in eight hospitals", *Bulletin of the Medical Library Association*, vol. 75, no. 4, pp. 291-301.
- Lancaster, J. 2000, "Planning the future by the present: personal view", *Health libraries review*, vol. 17, no. 1, pp. 2-6.
- Lavagnino, M. 1998, "How can technology help? Interviews with library directors", *Library Hi Tech*, vol. 16, no. 3/4, pp. 156-160.

- Lindberg, D. et al. 1993, "Use of MEDLINE by physicians for clinical problem solving", *JAMA*, vol. 269, no. 24, pp. 3124.
- Lindberg, D. & Humphreys, B. 1998, "Medicine and health on the Internet: the good the bad and the ugly", *Journal of the American Medical Association*, vol. 280, pp. 1303-1304.
- Marra, C. et al. 1996, "Drug and poison information resources on the internet, Part 1: An introduction", *Pharmacotherapy*, vol. 16, pp. 537-546.
- Marshall, J. 1992, "The impact of the hospital library on clinical decision making: the Rochester study", *Bulletin of the Medical Library Association*, vol. 80, no. 2, pp. 169-178.
- Marshall, J. et al. 2003, *Competencies for Special Librarians of the 21st Century*, Special Library Association Available from:
<http://www.sla.org/content/SLA/professional/meaning/competency.cfm>.
[01.07.2006].
- McDonald, C. et al. 1998, "Canopy computing: using the web in clinical practice", *Journal of the American Medical Association*, vol. 280, no. 1325, pp. 1329.
- Nicholas, D. et al. 2000, "The information 'player': a new concept for the information user", *Aslib Proceedings*, vol. 52, no. 5, pp. 163-165.
- O'Connor, P. 2002, "Determining the impact of health library services on patient care: a review of the literature", *Health Information and Libraries Journal*, vol. 19, no. 1, pp. 1-13.

- Oduwole, A. 1999, "A study of the impact of medical libraries on clinical decision-making in Nigeria University Teaching Hospitals", *Intl. Inform. & Libr. Rev.*, vol. 31, pp. 109-118.
- Pallen, M. 1995, "Guide to the Internet: the World Wide Web", *British Medical Journal*, vol. 311, pp. 1552-1555.
- Peters, R. & Sikorski, R. 1998, "Building your own: a physician's guide to creating a web site", *Journal of the American Medical Association*, vol. 280, pp. 1365-1366.
- Peterson, M. & Harris, L. 2002, "SALUS: online co-operation between South Australian health libraries", *Health Information and Libraries Journal*, vol. 19, no. 2, pp. 78-83.
- Reid, B. & Foster, W. 2000, *Achieving cultural change in networked libraries*, Gower, London.
- Siddiqui, M. 1996, "Library and information sciences education in Saudi Arabia", *Education for Information*, vol. 14, pp. 195-214.
- Spiegman, B. 1997, *Competencies for special librarians of the 21st century*, Committee on competencies for Special Library Association, Washington, DC.
- Urquhart, C. & Hepworth, J. 1995, *The Value of Information Services to Clinicians: a Toolkit for Measurement*, Department of Library and Information Studies, University of Wales, Aberystwyth.

Watson, L. 1998, "Information services: a mission and a vision", *Ariadne*, [Online], no. 14, pp. 6-7. Available from: <http://www.ariadne.ac.uk/issue14/main/>. [16/06/2006].

Young, J. 1999, "General practitioners' use of evidence databases", *Medical Journal of Australia*, vol. 170, pp. 56-58.

TABLES

Table 1: Seeking information

Source	Frequency	Percentage
Health Sciences library	222	45.0
Specialist meeting	4	0.8
Own collection	55	11.2
Online search	127	25.8
Department collection	30	6.1
Colleagues	33	6.7
Other	20	4.0
No answer	2	0.4
Total	493	100.0

Table 2: Purpose of visit

Visit for	Frequency	Percentage
Borrowing	124	25.1
Photocopying	55	11.2
Reading	195	39.6
Literature search	88	17.8
Other	26	5.3
No answer	5	1.0
Total	493	100.0

Table 3: Type of difficulty

Difficulty type	Frequency	Percent
Do not understand the system	17	7.7
I do not know how to get information myself	13	5.9
The location of the library	37	16.7
Opening hours	49	22.0
There are not enough resources	42	18.9
Other	54	24.3
No answer	10	4.5
Total	222	100.0

Table 4: Information needs

Information needed for	Frequency	Percentage
Clinical work	154	31.2
Up-to-date	219	44.4
Teaching	24	4.9
Examination	25	5.1
Writing a paper	37	7.5
No need for information	5	1.0
Other	23	4.7
No answer	6	1.2
Total	493	100.0

Table 5: Internet information rating

	Frequency	Percentage
Important	276	56.0
Fairly important	158	32.0
Not important	20	4.1
No answer	39	7.9
Total	493	100.0

Table 6: Use of Information tools

Information Tools	Frequency	Percentage
OPAC	21	4.3
Internet	344	69.8
CD-ROM	21	4.3
Card catalogue	52	10.5
Electronic databases	30	6.1
Other	10	2.0
No answer	15	3.0
Total	493	100.0

Table 7: E-services access

Access by	Frequency	Percentage
Library staff	71	14.4
Myself	235	47.6
Both	164	33.3
No answer	23	4.7
Total	493	100.0

Table 8: E-services evaluation

	Frequency	Percentage
Important	241	48.9
Fairly important	178	36.1
Not important	33	6.7
No answer	41	8.3
Total	493	100.0

Table 9: Learning to use e-sources

Learn to use e-sources	Frequency	Percentage
Assisted by staff	105	21.2
Self-taught/trial and error	147	29.8
Private training	31	6.3
Friend-colleague	171	34.7
Other	19	3.9
No answer	20	4.1
Total	493	100.0

Table 10: Training period

Duration	Frequency	Percentage
Days	37	18.7
Weeks	66	33.3
Months	76	38.4
Years	17	8.6
No answer	2	1.0
Total	198	100.0