

Information Needs and Sources of Doctors Working at Remote Government Health Facilities in Pakistan

Salman Bin NAEEM^{a,1}, Shamshad AHMED^{b,c,2} and Kamran ISHFAQ^{b,c,3}

^a*The Children's Hospital & Institute of Child Health, Multan, Pakistan*

^b*Department of Library & Information Sciences, The Islamia University of Bahawalpur, Pakistan*

^c*Social Welfare Department, The Children's Hospital & Institute of Child Health, Multan, Pakistan*

Abstract. The objectives of this study were to (a) determine the clinical information need of primary care doctors and (c) to describe the type of sources they use for patient management. The study was conducted in remote government health facilities in the District of Multan, Punjab, Pakistan. The participants of this study were all the medical officers working in Basic Health Units (BHU), Rural Health Centers (RHC) and Tehsil Headquarters (THQ), as these doctors met established criteria. Criteria included Health Facilities running under Executive District Officer (EDO) Health, Multan. A descriptive survey was conducted for data collection. A close ended questionnaire was developed after literature review and also accessed the situation of peripheries in Multan district. The questionnaire was discussed with two experts of library and information sciences and two senior doctors (>8 years' experience) working at remote government health facilities. It was revised to incorporate recommended improvements. Patient management, staying up-to-date, continuing medical education (CME) and evidence for policies and procedures were the main types of doctors' information need. The study summarized that doctors need a wide range of clinical information sources in remote areas for patient management.

Keywords: Information Needs; Information Sources; Access to Information; Clinical Information; Doctors; Primary Care; Remote Health Facilities.

Introduction

The health care system in Pakistan comprises of public and private sectors. Ministry of Health (MOH) at the Federal level plays a significant role in developing national policies and strategies for health in the country. Under the constitution of Pakistan, health is mainly responsibility of the provincial government, except in the federally administrated areas. Public health care and delivery system function as an integrated health complex that is administratively handled at a district level. Presently, Basic Health Units (BHUs) and Rural Health Centers (RHCs) are forming the core of the primary healthcare structure in the remote areas (Hakim, 1997; & Fikree, 2006). An enormous network of primary

¹ Corresponding Author: Salman Bin Naeem, Librarian, The Children's Hospital & Institute of Child Health, Abdali Road, Multan, Pakistan. e-mail: salmanbaluch@gmail.com

² Assistant Professor, Department of Library & Information Sciences, The Islamia University of Bahawalpur, Pakistan. e-mail: shamshadfarooka@gmail.com

³ Social Welfare Officer, Social Welfare Department, The Children's Hospital & Institute of Child Health, Multan, Pakistan. e-mail: kamranishfaqhc@gmail.com

health care centers exist throughout the country, which comprises, 5334 BHUs and Sub-Health Centers, 560 RHCs, 4712 Dispensaries, and 905 MCH Centers. At present BHUs cover around 10,000 people however RHCs cover around 30000-450000 people (Pakistan economic survey, 2006-07, 2012-13).

But no real attempt has been made in Pakistan to explore the information needs of primary care doctors and the sources they need to support their clinical practices. Therefore, this research study was initiated with an aim to explore the information need and sources of the doctors.

1. Literature Review

1.1. Doctor's Information Needs

Doctors involve in various types of patient's treatment and management on a regular basis which gives rise to information need. According to Belkin and Vickery's (1985) recognizing a gap in knowledge gives rise to information needs. Doctors face several challenges such as patient care, management and treatment choices in their daily clinical practices. These challenges could lead them to discover the amount of information and knowledge, they have in their minds is inadequate. Doctors realize that there is a gap between knowledge they have and the available external information sources. Therefore, they ought to seek clinical information by using various sources particularly databases and websites. Doctors also frequently consult to seniors in order to seek clinical information to fill the gap in their knowledge. Although Case (2007) has not expressed the idea of gaps in knowledge explicitly, he defined information needs as, the acknowledgment of knowledge inadequacy in order to fulfill the objectives. The recognition of gaps in knowledge gives rise to information seeking behaviors. In order to provide better treatment to patients, doctors need latest clinical information. According to Klein, Ross, Adams, and Gilbert (1994) usefulness of care is influenced by treatment and diagnostic decisions which depend on the accessibility of adequate current information from the most recent literature. Wensley (1999) elaborated key points at 5th National Rural Health Conference that primary care physicians should be given reliable and quick access to information sources for 24 hours a day and difficulty to information access for rural locations should be addressed. Bennett, Casebeer, Zheng and Kristofco (2006) identified that without the best information, patients care gets compromised, physicians raise questions but they pursue only few of the questions. Kaporiri and Bondy (2006) discovered in a research study that health planners and professionals suffer inadequate relevant information for decision making. Revere et al. (2007) reported that quick access to the latest information in order to support vital decisions for patient health cannot be disputed. The information should be ample, synchronized and accessible to meet the need of primary care doctors.

1.1.1 Types of Information Need

Leckie, Pettigrew, and Sylvain (1996) categorized the information need in two main categories according to the situation which gives rise to the information need; (a) clinical information (b) non clinical information. Cheng (2004) ascertained that during clinical practices doctors encountered 91% questions linked

to clinical information acquisition while only 9% of the questions were related to managerial, teaching and educational purposes.

1.1.1.1. Clinical Information Needs

Clinical information needs are related to information regarding patient management and clinical decision making. Clinical information need, in the perspective of patient care and management, comprises basic information about patient's medical history, diagnosis and treatment choices. Thompson (1997) reported that many studies have been conducted to find out the doctors information need has ignored the patient data and concentrated on the medical questions which can be answered by common medical literature.

1.1.1.2. Non-Clinical Information Needs

The Doctor's information need is not only limited to clinical information but to non clinical information as well. Doctors need non clinical information for research and managerial work. Most of the studies have discussed a clinical information need of the doctors and slightly less research has been done on doctor's non clinical information needs (Owens & Tomlin, 1998; & Davies, 2007). Non-clinical information needs, which include information that can help in educational objectives of the doctors is not directly interlinked with patient care and management. Normally doctors need non-clinical information during research, teaching or learning process. Though the real purpose of seeking non-clinical information is helpful in educational perspective of the doctors but non-clinical information ultimately adds into a doctor's knowledge and impact on a clinical practice. Gonzalez- Gonzalez et al. (2007) reported that 13% questions which were asked by primary care doctors in the situation of patient care were categorized in the thirty non clinical categories. The non clinical information included information about administrative issues 5.5%, educational matters 3.3%, legal issues 0.8% and ethics 2.0%. According to Gonzalez- Gonzalez, Some other questions were also asked to the respondents but they did not fit in any category of non clinical information need and these questions were 1.4% of the total. Lundeen, Tenopir and Wermager (1994) reported that there is a less need of non clinical information among doctors except those who are involved in teaching and research activities. They have a greater amount of need for non clinical information.

1.1.2. Recognized and Unrecognized Needs

Wyatt and Sullivan (2005) reported that during clinical practice doctors face several challenges. One of the challenges they face most commonly is to identify recognized needs; it is observed while making clinical decisions for patient care and management doctors need more information. It is important for doctors to acknowledge whether there is a need of further information or their own knowledge is sufficient to fulfill their needs. According to Gorman (1995) recognized needs are those which are acknowledged and expressed by doctors; although recognized needs are often considered as a major driving force in making a decision to seek information. Seol et al. (2004) reported that recognized needs can be expressed with comparatively few questions. Unrecognized information needs may possibly mean that sometimes there is an important need for information, but it

is not explained clearly as it is very important in order to make a critical clinical decision regarding patient management. Davies (2007) pointed out that most studies carried out on doctor's information need have neglected the unrecognized information needs of doctors because it is quite difficult to explore unrecognized needs.

1.2. Clinical Information Sources

There are many sources that can affect or set the information seeking behaviors of doctors. One of the things that affects on doctors' information seeking behavior is the rapid growth of literature. According to Wyatt and Sullivan (2005) amount of medical literature gets double after every 20 years. With this huge amount of growth in literature, it is impossible for doctors to keep abreast with all the latest and updated information in the context of patient management. Thus doctors can enhance their knowledge to keep abreast by utilizing various information sources. Multiple types of information sources exist which provide information, but the most important type of the sources are formal and informal sources; formal sources include print and electronic sources and informal sources include personal communications. It is more important to determine which types of sources are used mostly by the doctors rather than just identifying the type of sources in order to understand the information need and seeking behavior of the doctors. According to Khalid, Akbar, Tanwani, Tariq and Farooq (2008) Pakistan is a developing country. More than 60% of its population lives in rural areas with insufficient health facilities. It is assumed that their health gets compromised because doctors in remote areas have no access to current clinical information sources.

Recognizing user's information need and sources they use, is always quite very challenging. It is one of the most important topics to be discussed in library and information sciences. Information needs and other aspects of information which motivates doctors to seek clinical information is one of the areas which have been explored and investigated by many researchers around the world (Dee & Blazek, 1993; Shelstad & Clevenger, 1996; Bryant, 2004; & Lappa, 2005). However, this area has not been explored before in Pakistan. Currently available data is very insufficient to make able the health planners and providers to understand the primary care doctors' information needs and sources. Therefore, this study was initiated to identify the clinical information needs and to describe the clinical information sources of primary care doctors in the district of Multan, Pakistan. According to Bailey et al. (2000) study of users' characteristics is important, which gives an understanding that what kinds of information, a person probably needs.

2. Definitions of the terms

2.1. Information Need

“A recognition that your knowledge is inadequate to satisfy a goal that you have” (Case, 2007).

2.2. Clinical Information

“The commodity used to help make patient's care decisions” (Wyatt, 1996).

2.3. Clinical Information Needs

Kind of information that is likely to be needed with reference to patient's care and to support the clinical decision making of doctors.

2.4. Remote

Isolation as a result of infrastructure, communications and resources as well as being isolated from professional peers and supports.

2.5. Primary Health Care (PHC)

Is provided by a health care professional in the first contact of a patient with the health care system.

3. Objectives of the Study

1. To determine the clinical information need of primary care doctors.
2. To establish the clinical information sources primary care doctors need to support their clinical practice.
3. To give recommendations to meet the clinical information needs and sources of primary care doctors.

4. Methodology

The study was conducted in remote government health facilities of the District of Multan, Pakistan. Using a database of the District Health Multan, we selected those listing medical officers, working in primary health care in remote areas of the district. A total of hundred and twenty two doctors were working in the primary health care centers which include Basic Health Units (BHU), Rural Health Centers (RHC) and the Tehsil Headquarters (THQ). All doctors met the inclusion criteria of the study. Criteria includes Health Facilities running under Executive District Officer (EDO), Health Department, Govt. of Punjab and doctors working as a full time regular employee in remote government health facilities in district Multan. A close ended questionnaire was developed after relevant literature review which gave a new insight of the problem and also accessed the situation of peripheries in district Multan. The questionnaire was discussed with two consultants of teaching hospitals and two senior doctors (>8 years' experience) working at remote government health facilities. It was revised to incorporate recommended improvements. The structured questionnaire was distributed to a one hundred and twenty two doctors who met the established criteria. A three part questionnaire was pilot tested among small sample of primary care doctors. Part one covered demographic data, including respondent's name (optional), gender, age, and health facility related questions. Part two covered questions relating to need of clinical information. Questions regarding clinical information sources were covered in part three. The data were analyzed statistically, through SPSS (Statistical Package for the Social Sciences) version 19. Descriptive statistic was applied to analyze the data which include: frequency distribution, percentages and standard deviations. A five point Likert scale was used in questionnaire

to gather the responses. A Likert scale measures the extent to which a person agrees or disagrees with the question. The most common scale is 1 to 5. Often the scale will be 1=strongly disagree, 2=disagree, 3=not sure, 4=agree, and 5=strongly agree. A likert scale used in this study was ranging from 1 to 5; 1=never, 2=rarely, 3=occasionally, 4=frequently, and 5=most frequently.

Respondents' anonymity and confidentiality were ensured. Verbal permission was obtained from Executive District Officer, Health, Multan to gather a data for this study.

5. Results

5.1. Demographic Information

A total of 122 questionnaires were distributed to the subjects. Out of 122 subjects, 105 (86.06%) returned the questionnaire. The valid responses were 100 (81.96%). Of 100 subjects, 94 (94%) were male and 6 (6%) were female. Majority of the respondents 29 (29%) age were between 21-30 years, 27 (27%) respondents age group were between 31-40 years, 26 (26%) between age group of 41-50 years while 18 (18%) respondents were between age group of 51-60 years. Of 100 respondents, 67 (67%) were working in Basic Health Unit (BHU), 24 (24%) mentioned their work place as Tehsil Headquarters (THQ) and 9 (9%) respondents mentioned Rural Health Centers (RHC) as their work place.

5.2. Need of Clinical Information

Respondents were asked questions regarding their clinical information needs. Table 1.1 shows that respondents 'frequently' need clinical information for patient management, staying current/ up-to-date, continuing medical education (CME) and Evidence for policies and procedures with a mean score 4.18, 3.83, 3.69 and 3.58 respectively. On the other hand respondents' need clinical information 'occasionally' for teaching and research purpose with a mean value 3.03 and 3.01 respectively.

Table 1.1 Need of Clinical Information by Respondents

Rank	Clinical Information Need	N	Mean	Std. Deviation
1	Patient Management	100	4.18	.833
2	Staying Current/ Up-to-date	100	3.83	1.064
3	Continuing Medical Education (CME)	100	3.69	1.089
4	Evidence for Policies and Procedures	100	3.58	1.112
5	Teaching	100	3.03	1.210
6	Research	100	3.01	1.382

Scale: 5=Most Frequently, 4=Frequently, 3=Occasionally, 2=Rarely, 1 =Never

5.3. Need of Clinical Information Sources

Table 1.2 shows a result of clinical information sources, respondents were asked; what kind of clinical information sources they need to support their clinical practice. They ranked 'current clinical practice' sources as first with a mean score of 4.11. 'Treatment guidelines', 'protocols and health status indicators' were ranked second and third respectively with an equal mean score of 4.02 each. 'National policies', 'clinical trials',

‘evidence based medicine’ and ‘current research’ sources were ranked fourth, fifth, sixth and seventh with a mean score 3.94, 3.92, 3.90 and 3.78 respectively.

Table 1.2 Need of Clinical Information Sources by Respondents

Rank	Clinical Information Sources	N	Mean	Std. Deviation
1	Current Clinical Practice	100	4.11	.909
2	Treatment Guidelines & Protocols	100	4.02	.995
3	Health Status Indicators	100	4.02	.899
4	National Policies	100	3.94	.983
5	Clinical Trials	100	3.92	.929
6	Evidence Based Medicine	100	3.90	.980
7	Current Research	100	3.78	.927

Scale: 5=Most Frequently, 4=Frequently, 3=Occasionally, 2=Rarely, 1 =Never

5.4. Print Source

Respondents were asked a question that what types of print sources best meet their clinical information needs. Table 1.3 shows a result in which respondents ranked ‘medical text books first’, ‘medical journals’ second and ‘clinical manuals/protocols’ were ranked third by respondents.

Table 1.3 Print Sources for Clinical Information

Rank	Print Sources	N	Mean	Std. Deviation
1	Medical Textbooks	100	4.07	1.047
2	Medical Journals	100	3.99	1.141
3	Clinical Manuals/Protocols	100	3.78	1.011

Scale: 5=Most Frequently, 4=Frequently, 3=Occasionally, 2=Rarely, 1 =Never

5.5 Human Sources

Table 1.4 describes the results of human sources needed by respondents in their day to day clinical practice. They were asked a question that what kind of human sources best meet their clinical information needs. Respondents ranked ‘discussion with consultants/ specialist’ as first, ‘discussion with colleagues’ as second, ‘GP consultation’ was ranked third and ‘discussion with pharmaceutical’ representatives were ranked fourth.

Table 1.4 Human Sources for Clinical Information

Rank	Human Sources	N	Mean	Std. Deviation
1	Discussion with Consultants/ Specialist	100	3.82	1.086
2	Discussion with Colleagues	100	3.73	.993
3	GP Consultation	100	3.44	1.085
4	Discussion with Pharmaceutical Representative	100	2.99	1.291

Scale: 5=Most Frequently, 4=Frequently, 3=Occasionally, 2=Rarely, 1 =Never

5.6. Electronic Sources

Table 1.5 shows the result of electronic sources, respondents were asked a question that what kinds of electronic sources best meet their clinical information needs. Online databases/ clinical websites and CD ROM sources ‘frequently’ meet respondents’ clinical

information needs with a mean value 3.85 and 3.68 respectively while audiovisual sources ‘occasionally’ meet respondents’ clinical information need with a mean value 3.23.

Table 1.5 Electronic Sources

Rank	Electronic Sources	N	Mean	Std. Deviation
1	Online Databases/Clinical Websites	100	3.85	1.123
2	CD ROM	100	3.68	1.154
3	Audiovisual Sources	100	3.23	1.145

Scale: 5=Most Frequently, 4=Frequently, 3=Occasionally, 2=Rarely, 1 =Never

5.7. Other Sources

In other clinical information sources, continuing medical education (CME) ‘frequently’ ($\mu=3.68$) meet the respondents clinical information needs while personal collections ($\mu=3.45$), and symposia/conferences ($\mu=3.27$) ‘occasionally’ meet respondents’ clinical information need (Table 1.6).

Table 1.6 Other Clinical Information Sources

Rank	Other Sources	N	Mean	Std. Deviation
1	Continuing Medical Education (CME)	100	3.68	1.062
2	Personal Collections	100	3.45	1.009
3	Symposia/Conferences	100	3.27	1.205

Scale: 5=Most Frequently, 4=Frequently, 3=Occasionally, 2=Rarely, 1 =Never

5.8. Satisfaction with Currently Available Clinical Information Source

Figure. 1 shows the results of respondents’ satisfaction with currently available clinical information sources. Of 100 respondents, 41 (41%) respondents were ‘little satisfied’ while 33 (33%) respondents were ‘not at all satisfied’ with currently available clinical information sources at remote government health facilities. On the other hand only 13 (13%) respondents were ‘reasonably satisfied while 8 (8%) respondents were ‘quite satisfied’ and 5 (5%) respondents were ‘very satisfied’ with currently available clinical information sources.

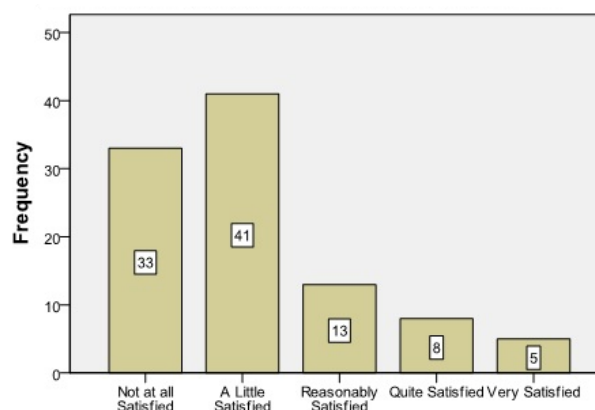


Figure 1. Satisfaction with available Clinical Sources Overall

6. Discussion

Doctors cannot practice high quality medicine without continually updating their clinical knowledge which can be achieved only by discussions and consultations with other doctors, updating latest and synchronized biomedical information through medical journals, online databases and websites (Asad, 2009; Revere et al, 2007; Martin et al, 1997; & Gonzalez et al, 2007). Medicine is an information oriented field, and experienced doctors use millions of pieces of information to manage their patients (Wyatt, 2005). However, It is quite evident in the results of this study that majority of primary care doctors were not satisfied with the available clinical information sources in their region. It can be assumed that dissatisfaction with information sources can lead them to despondency in information need which can directly affect on patient's care which supports the results of a study conducted in Kenya (Gatero, 2011; Gorman, 1995). The results of this study are similar to other study conducted previously that doctors mainly need information for patient management, professional updating on the current medical practices and continuing medical education. When the doctors needed clinical information they turned to seniors and colleagues. Medical textbooks and medical journals were also frequently used as sources of information (Gatero, 2011). In our study, the data reveals that there is more use of print sources as compare to electronic sources, which is similar to the other studies (Trivedi & Joshi, 2009; De-Groote, Shultz & Doranski, 2005; Cheng, 2004)

Medical literature is expanding very rapidly; new techniques and inventions are being introduced to make this information available to health care workers universally. During the last two decades, there has been significant progress and improvement in primary health care sector after the 'health for all goals and care approach' adopted by all member countries of the World Health Organization (WHO). According to Perera (2009) access to constant health care services is one of the important indicator to consider for a country's sustainable development. Godlee et al (2004) reported that 'universal access to information for health care workers is a prerequisite for meeting the Millennium Development Goals and achieving the health for all'. It is therefore very important for doctors to keep abreast with current clinical information sources and medical practices to provide a better patient care.

7. Study Limitations

The shortcomings of this study include, sample size was not very big but still reflects the overall situation of the health centers of this District but the results of this study cannot be generalized on other Districts. Though the inadequacy of clinical information sources impact on patient care were not observed in this study but it is rather assumed that it affects diagnostic and treatment decisions

8. Conclusion

This study has demonstrated the information need and sources of primary care doctors. Results of this study concluded that doctors working in remote government health facilities were suffering with lack of current clinical information sources. Majority of doctors were not satisfied with the present situation of clinical information resources

available to them at their respective health centers which can directly affect patient's care. It is also taken as a disability to keep abreast with current clinical information. Finally, the findings of this study encourage further research on the topic of clinical information seeking in primary care and the barriers primary care physicians face in remote government health facilities in Pakistan.

9. Practical Implication

Study results demonstrated the context in which doctors need information and utilize the sources. It also demonstrated the satisfaction level of the doctors with currently available sources. Such type of studies should be conducted in other part of the country as well as in developing countries in order to explore the real situation of information need and sources of the doctors. So gaps in information provision may be identified and these gaps should be filled by providing needed information sources to doctors which will help them to provide better patient care.

10. Recommendations

Following recommendations are made based on the conclusions of the study in order to meet the clinical information needs of the primary care doctors working in remote government health facilities.

1. Primary care doctors should be provided assistance of senior doctors/consultants, so they may discuss the management and treatment choices of a difficult clinical case with seniors. This step will avoid huge numbers of referral cases to tertiary and urban hospitals and also patient's treatment will get improved.
2. Latest editions of textbooks, handbooks, atlas, drug guidelines and encyclopedias should be made available in these government health facilities likewise small libraries in the premises of health facilities should be developed. This step will encourage the doctors to learn new techniques and methods.
3. Provincial Health departments should take a step towards building an Online Clinical Information System (OCIS), where primary care doctors in remote setting would be able to search clinical information related to clinical cases on one online portal.
4. Newsletters should be published carrying out the activities related to health practices and also demonstration to various online resources should be provided in it, so primary care doctors would be able to get familiar with the new information resources.
5. Trainings on the usage of clinical information resources should be provided on regular basis by health department on district basis. Doctors should be encouraged to participate in these programs.

References

- Asad, A. k. (2009). *Failure analysis of primary health care in Pakistan and recommendations for change*. Retrived August 22, 2012 from: <http://www.insaf.pk>
- Bailey, P., Banwell, L., Kinghom, S., McFarlanes, H., & Walton, G. (2000). Information needs analysis to inform the development of a library and information service at the Marie Curie Centre, Newcastle upon Tyne, England. *Health Libraries Review*, 17 (2), 71-76.

- Belkin, N., & Vickery, A. (1985). *Interaction in information systems: A review of research from document retrieval to knowledge-based systems*. London: The British Library Board.
- Bennett, N. L., Casebeer, L. L., Zheng S., & Kristofco, R. (2006). Information seeking behaviors and reflective practice. *Journal of Continuing Education in the Health Professions*, 26 (2), 120-127.
- Bryant, S. L. (2004). The information needs and information seeking behaviour of family doctors. *Health Information and Libraries Journal*, 21(2), 84-93.
- Case, D. O. (2007). *Looking for information. A survey of research on information seeking, needs, and behavior* (2nd ed.) San Diego, CA: Academic Press.
- Cheng, G. Y. (2004). A study of clinical questions posed by hospital clinicians. *Journal of the Medical Library Association*, 92 (4), 445-458.
- Davies, K. (2007). The information seeking behaviour of doctors: A review of the evidence. *Health Information and Libraries Journal*, 24 (2), 78-94.
- Dee, C., & Blazek, R. (1993). Information needs of the rural physician: A descriptive study. *Bulletin of the Medical Library Association*, 81 (3), 259-264.
- De-Groote, S. L., Shultz, M., Doranski, M. (2005). Online journals' impact on the citation patterns of medical faculty. *Journal of the Medical Library Association*. 93(2): 223-28.
- Fikree, F.F., Ali, M.M., & Inaam-Ul-Haq (2006). She may research a facility but will still die! An analysis of quality of public sector maternal health services, District Multan, Pakistan. *Journal of Pakistan Medical Association*, 56,156.
- Gatero, G. (2011). Utilization of ICTs for accessing health information by medical professionals in Kenya: A case study of Kenyatta National Hospital. *Journal of Health Informatics in Developing Countries*, 5(1), 60-88.
- Godlee, F., Walsh, N. P., Ncayiyana, D., Cohen, B., & Packer, A. (2004). Can we achieve health information for all by 2015?. *The Lancet*. Retrieved August 19, 2012 from: <http://image.thelancet.com/extras/04art6112web.pdf>
- Gonzalez-Gonzalez, A., Dawes, M., Sánchez-Mateos, J., Riesgo-Fuertes, R., Escortell-Mayor, E., Sanz-Cuesta, T., & Hernández-Fernández, T. (2007). Information needs and information seeking behaviour of primary care physicians. *Annals of Family Medicine*, 5 (4), 345-352. Retrieved from <http://www.annfammed.org>
- Gorman, P. (1995). Information needs of physicians. *Journal of the American Society for Information Science*, 46 (10), 729-736.
- Hakim, K. F. (1997). Role of health systems research in policy, planning, management and decision making, with reference to Pakistan. *Eastern Mediterranean Health Journal*. 3(3), 556-566.
- Kapiriri, L., & Bondy, S. J. (2006). Health practitioners' and health planners' information needs and seeking behavior for decision making in Uganda. *International Journal of Medical Informatics*, 75 (10-11), 714-21.
- Khalid, M. Z., Akbar, A., Tanwani, A. K., Tariq, A., & Farooq, M. (2008). Using telemedicine as an enabler for antenatal care in Pakistan. *E-Medixs*, 1-8.
- Lappa, E. (2005). Undertaking an information needs analysis of the emergency care physician to inform the role of the clinical librarian: A Greek perspective. *Health Information and Libraries Journal*, 22 (2), 124-132.
- Leckie, G., Pettigrew, K., & Sylvain, C. (1996). Modeling the information seeking of professionals: A general model derived from research on engineers, health care professionals and lawyers. *Library Quarterly*, 66 (2), 161-193.
- Lundeen, G. W., Tenopir, C., & Wemager, P. (1994). Information needs of rural health care practitioners in Hawaii. *Bulletin of the Medical Library Association*, 82 (2), 197-205.
- Martin, E. R., McDaniels C., Crespo, J., & Lanier, D. (1997). Delivering health information services and technologies to urban community health centers: The Chicago AIDS. Outreach Project. *Bulletin of the Medical Library Association*, 85 (4), 356-361.
- Owens, I., & Tomlin, A. (1998). *PRISE Project: Final Report*. Oxford: Institute of Health Sciences. Cited in Bryant, S. (2004). The information needs and information seeking behavior of family doctors. *Health Information and Libraries Journal*, 21 (2), 84-93.
- Pakistan economic survey 2006-2007. Health and Nutrition. Ministry of Finance. http://www.finance.gov.pk/survey_0607.html
- Pakistan economic survey 2012-2013. Health and Nutrition. Ministry of Finance. http://www.finance.gov.pk/survey_1213.html
- Perera, G. I. U. S. (2009). Implementing healthcare information in rural communities in Sri Lanka: A novel approach with mobile communication. *Journal of Health Informatics in Developing Countries*, 3 (2), 24-29.
- Revere, D., Tumer, A. M., Madhavan, A., Rambo, N., Bugni, P. F. Bugni,.... Fuller, S. S. (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.

- Seol, Y., Kaufman, D., Mendonça, E., Cimino, J., & Johnson, S. (2004). *Scenario base assessment of physicians' information needs*. In: Fieschi, M. et al. (Eds). MEDINFO. Amsterdam: IOS Press. 306-310. Available at: <http://www.dbmi.columbia.edu> [Accessed 19.03.2013].
- Shelstad, K., & Clevenger, F. (1996). Information retrieval patterns and needs among practicing general surgeons: A state wide experience. *Bulletin of the Medical Library Association*, 84 (4), 490-497.
- Thompson, M. (1997). Characteristics of information resources preferred by primary care physicians: A literature review. *Bulletin of the Medical Library Association*, 85 (2), 187-192.
- Trivedi, M., Joshi, A. (2009). Usage of electronic journals (e-journals) versus print journals by healthcare professionals in H M Patel Centre for Medical Care and Education (HMPCME). *Journal of Health Informatics in Developing Countries*, 3(1), 13-16.
- Wensley, M. (1999, 14-17 March). *The NSW health clinical information access project (CIAP) web site: Leaping the boundary fence via the internet*. Proceeding of the 5th National Rural Health Conference, Adelaide, South Australia.
- Wyatt, J. (1996). Medical informatics: Artifacts or science? *Methods of Information Medicine*, 35 (3), 197-200.
- Wyatt, J., & Sullivan, F. (2005) ABC of health informatics keeping up: Learning in the work place. *British Medical Journal*, 331 (12), 1129-1132.