



## The clinical librarians and information professionals' role in tele-medicine: assisting the general practitioners working in rural areas of Kerman Province in the treatment process

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### ABSTRACT

**Introduction:** Over the last decade, the role of clinical librarians in assisting general practitioners to provide better health care has been proved. Rapid progress in telecommunication technology has emerged this question. Could clinical librarians be able to assist general practitioners working in rural and remote areas through Information and communication technologies? This project sought to evaluate whether clinical librarians are able to provide accurate and updated information to physicians.

**Method:** Twenty general practitioners working in non rural working in remote areas of Kerman were requested to ask clinical librarians 5 questions through a phone line each over the period of two months whenever they felt they need to have more information on a matter related to their practice. Then all questions and answers were evaluated by expert medical specialists and pharmacists who were academic staff of Kerman University of Medical Sciences . Clinical librarians' role was also evaluated by an electronic questionnaire sent to general practitioners.

**Results:** Over 80 percents of the answers were evaluated as perfect and 10 percent as good. Only 10 percent of the answers were scored as wrong.

**Conclusion:** Clinical librarians are able to provide reliable information to remote and rural physicians, The fact which has been also verified by the specialists. However, clinical librarians need to improve their English language and their knowledge about online search strategies and basic medication. Telecommunication infrastructure and suitable internet speed for online search by librarians are very important.

**Keywords:** Clinical librarian and information professional, Telemedicine, Tele clinical librarian, Deprived areas, EBM(Evidence Based-Medicine), Remote health centers, General physicians(GPs)

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### Introduction

Taking advantage of the latest medical achievements is a significant factor in timely diagnosis of diseases and provision of the best therapeutic measures. But because of the increased growth of information sources and the use of advanced information and communication technologies in information storage and retrieval systems, physicians have been faced with serious challenges. They do not usually have enough time or skills to use these systems, especially those general practitioners (GPs) who work in non-urban regions with a large number of patients and without access to these systems. If for any reason they fail to receive the immediate and appropriate responses to their clinical questions, serious and irreversible impairment will occur in the different processes of health care, particularly in

cases such as medical emergencies in which the response to patients' questions is of great importance in the treatment process.

So the importance of access to the latest and the most relevant medical information involves thinking about specific solutions. One solution that has recently attracted the attention of researchers in the field of medicine is to use and benefit from the expertise of clinical librarians and information professionals who are apparently familiar with a variety of both printed and electronic resources. Furthermore, using the specific knowledge and skills in the areas of training, facilitating, counseling and providing reliable, timely and necessary medical information, they can play an important role in satisfying the information needs of the medical staff. In addition, they are known as intermediaries between information and GPs and so

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are considered as the main core in knowledge document delivery. Thus they are able to help the medical team in the care and treatment process.

If they prove to have this ability, it will be possible to make effective use of new medical information systems for developing an effective strategic tool to provide the information needed by GPs in decision support systems (DSS) for patient care. Evidence-based medicine (EBM) is an area in which the role of clinical librarians is well determined (1-3) including their effective role in teaching the principles of evidence-based medicine (4-6). This area actually constitutes the main field work of clinical librarians. In addition, performing quick and efficient search in medical databases to provide relative answers to the questions posed, along with training on how to use the new information systems, determines their key role in information services in the medical field.

The most important results reported in previous studies in this area include expressed satisfaction of GPs because of the presence of clinical librarian (7), clinical librarians' role in improving the quality of patient care (8) and treatment (9), medical information services provided to the patient's bedside (10), Keeping up-to-date medical information and enhancing the collaboration between GPs, providing the clinical approaches for improving clinical practice of the decision support systems along with information-seeking skills and reduction of medical errors (11, 12), collaborating with medical specialists (13), and affecting the clinical librarian services on information behavior in clinical teams (14). It is worth noting that any particular aspect of clinical library and information science has been considered in the research conducted in this field up to now, including investigations of the clinical librarian role on the feasibility of clinical librarian services a procedure of answering the clinical questions (15), clinical library services in patient care (16, 17), supporting system in this field (18), the GPs' information needs analysis by clinical librarians (19), a survey of the development of clinical librarian and its evaluation through systematic review (11, 20), and clinical library services as to cost-effectiveness (21).

These studies have usually focused on urban and developed areas; hence, the rural and deprived areas have been neglected, while there are often considerable differences in terms of the health care system facilities between rural and urban centers. The health care systems in urban areas are usually equipped with modern information technologies, scientific and reliable databases in the field of medical and allied sciences as well as valid and updated evidence-based information to serve patients and provide treatment. In contrast, there is no access to the best response for GPs working in health centers of rural and deprived areas due to poor infrastructure and inadequate information facilities in the care and treatment of patients in these centers. In their daily clinical practice, these practitioners are often face with some multiple and sophisticated questions that are not answered in books.

On the other hand, for various reasons such as lack of access to computer systems, medical databases and health information or lack of required skill for information

search and retrieval, finding information related to their needs may not be possible for them. So many questions remain unanswered in the care and treatment of patients and they are faced with the so-called "knowledge gap". Therefore, because of this gap, this study aimed to examine the feasibility of the application of clinical library and information services in telemedicine. In this way, along with studying the feasibility of these services, the clinical librarians' role in assisting the GPs working in the remote and deprived areas of the province of Kerman was also investigated.

To achieve the overall objective of this study, there was a need to evaluate the clinical librarians' ability from the viewpoint of GPs working in these areas. This evaluation consisted of two parts: 1) to understand and analyze the question, to provide the correct, updated and evidence-based answers to the questions at the designated time, to help making decisions for early diagnosis of diseases, to solve the health problems, to improve the quality of treatment, and to examine the potential role of clinical librarians in possible reduction of medical errors and potential knowledge gaps in the health care system; 2. To determine the accuracy and timeliness of the responses that the clinical librarians provide for GPs from the viewpoint of the specialist physicians.

The results of this study can be useful in preparing for the use of clinical library services in the health care and medical informatics systems, providing facilities for reducing the probable knowledge gap, medical errors and mortality. Therefore the health care services will be improved.

## Methods

This is a cross-sectional, descriptive and applied study. Regarding the research topic, the related keywords were searched deeply to provide the authoritative and appropriate data to fit on a logical analysis to conduct this study. The population consisted of 20 general practitioners (GPs) working in health-care centers located in remote and deprived areas of Kerman province, as well as GPs with at least twenty years of work experience in these areas. The sample consisted of 149 clinical questions which the GPs asked the clinical librarians during 2 months (from 23 October 2011 to 21 December 2011). The data collection tools were two questionnaires: one for measuring the level of the GPs' satisfaction and evaluating the librarians' work, and the other for assessing the validity of any of the questions and answers raised, according to the specialist physicians' viewpoints.

To accomplish this project, at the beginning the experienced and expert clinical librarians, skilled in search and information retrieval were requested to cooperate in answering the medical questions. These librarians, at the time of research had already worked in three libraries of Kerman University of Medical Sciences such as central library, library of Management and Information school and the library of Nursing school. Then, the infrastructure requirements and facilities available were monitored and reviewed to enable the librarians and practitioners to remotely communicate with each other.

In the next step, the 20 physicians were selected by random sampling from a total list of GPs working in deprived areas of Kerman province. By explaining the main objective of the project for them, we requested them to ask their clinical questions which could be raised during their clinical practice of the librarians by phone. Thus during two months, every GP asked each of the clinical librarians five questions every day (total questions asked were 149).

Clinical librarians were responsible to immediately search the appropriate databases in the field of medicine and evidence-based medicine to meet the physicians' information needs. In this way, the librarians were asked to provide appropriate answers immediately to the GPs. To do this, he/she should put his/her answer in a form that had been made by the researchers for this purpose, while its validity and reliability had also been measured. If the librarian could not reply immediately, they could review the relevant information resources, and after checking the validity of the information retrieved, email the response to the physician in a short time interval, depending on the degree of difficulty and complexity of the question, or refer him/her to the sources containing their required information.

Then for measuring the accuracy and updating of any answer given by the librarians, a feedback pre-assessed form was developed and delivered to the specialist physicians while requesting them to assign a score from 1 to 5, based on the Likert scale. Based on the collected

**Table 1.** Frequency distribution and level of satisfaction of GPs with the ability of librarians in each of the areas assessed

Areas of assessment Estimated data(Likert scale)	Reducing potential knowledge gap		Quality improvement of treatment and timely diagnosis of diseases		Reducing potential medical errors		Decisions to solve health problems		Timely responses, accurate and evidence-based		Understanding and analysis of clinical questions	
	percent	number	percent	number	percent	number	percent	number	percent	number	percent	number
Completely dissatisfied(1)	0	0	0	0	0	0	0	0	0	0	0	0
Dissatisfied(2)	0	0	0	0	0	0	0	0	15	3	0	0
No comments(3)	5	1	65	13	10	2	0	0	25	5	0	0
Satisfied(4)	70	14	35	7	90	18	45	9	60	12	75	15
Completely satisfied(5)	25	5	0	0	0	0	55	11	0	0	25	5

questionnaires, the most questions raised belonged to the fields of pediatrics, obstetrics and gynecology, psychiatry and pharmacology, so in this phase, the specialists were selected from these fields (one specialist in every field).

Finally the electronic questionnaires containing 9 questions were sent to the GPs participating in the project. The objectives were to evaluate the job satisfaction of the GPs participating in the study, to assess the collaboration of librarians, to assess the time and quality of consultancy and finally to assess the specialists' opinions about the accuracy and updating of the clinical librarians' answers. The most important limitations of this study are the low-speed of internet, sometimes internet disconnection in

the workplace, access problems with health centers and attracting the physicians' cooperation in deprived and remote areas and a busy workplace that resulted in asking inadequate questions for the treatment of patients or in delayed contact with the librarian.

**Results**

The data obtained from the questionnaires and evaluation forms are presented in tables. To achieve the main objective of this research, initially the level of the GPs' satisfaction with clinical librarians' functioning was measured and analyzed (Table 1).

Based on the below table, physicians' satisfaction about the ability of librarians within each of the areas was assessed as follows: the comprehension questions 100%, Timely accurate responses 60%, Decisions to solve health problems 100%, Reducing potential medical errors 90%, Quality improvement of treatment 35%, and Reducing potential knowledge gap 95%. According to these results, areas that received the highest ratings from the perspective of physicians were as follows, respectively: 1.Understanding and analysis of clinical questions, 2.Decisions to solve health problems,3. Reducing potential knowledge gap and 4.Reducing potential medical errors.

Altogether the total number of questions in different medical categories asked by physicians was 149 which have been sorted from the maximum to the minimum number of questions in the related areas.(Table 2)

According to the below table, from the 149 questions asked by GPs, the least questions belonged to the fields of oral diseases, diabetes, Malaria and oncology (1%), while the most questions belonged to the field of pharmacology (71%). Overall, the above data show that the four fields of drug, pediatrics, obstetrics and psychiatry were mostly asked. Furthermore, it should be noted that the mean and the standard deviations of the scores based on the expert

**Table 2.** Distribution of questions in different medical areas

Questions of the medical fields	Percent	Number	Questions of the medical fields	Percent	Number
General	4	4.5	Pharmacology	64	71
Neurology	5	5.6	Pediatrics	21	23.6
Oncology, dentistry, diabetes and malaria*	4	4.4	Obstetrics and Gynecology	17	19.1
AIDS	3	3.4	Psychiatry and Addiction	13	14.6
Skin	3	3.4	Internal medicine	9	10.1
Total questions	149	100	Addiction, Infectious Disease and Urology**	6	6.6

\*one question from each field

\*\*two questions from each field

opinions, with a Likert scale, about the accuracy and updated responses of librarians were respectively  $4.35 \pm 1$  and  $4.33 \pm 1$  with a median of 5.

### Discussion

The GPs' positive evaluation with high percentage about the clinical librarians' function belonged to areas of understanding questions (100%), timely and accurate responses (60%), decisions to solve health problems (100%), reducing potential medical errors (90%) and reducing potential knowledge gap (95%)(Table 1). While confirming the results of previous studies (10-14), the results allow us to explicitly comment on the effective role of the clinical librarians in health care systems.

Of course, having the knowledge of LIS part of which involves the familiarity with a variety of medical information resources as well as specific knowledge of methods and techniques of information storage and retrieval is not far-fetched to expect. In addition to having information seeking skills in printed sources, they have certain capabilities in searching the electronic resources and taking advantage of medical search engines and databases in the best way. This is an essential capability, particularly with the rapid development of information technology to know how to use it as a key prerequisite for the growth of knowledge in medical sciences.

A major part of the clinical librarians' job duties is to meet the information needs of health staff according to evidence-based medical information and provide valid responses to their clinical questions. According to the results, 85 percent of physicians positively assessed the role of the librarians in the fields of experts, medical education and developing evidence-based guidelines for GPs in promoting the treatment process.

### Conclusion

So, regarding the important role of clinical librarians in the remote health systems along with the urgent need of the rural areas for a 24-hour center to respond to the information requested by the GPs in health-care systems, it is necessary to make prompt decisions for implementing and performing the clinical library services projects and specifically employing clinical librarians to serve the GPs

and health staff working in deprived centers. Since this design has not been implemented in Iran, apart from a few hospitals and Clinical Centers (including two University of Medical Sciences, Tabriz and Tehran), its implementation in deprived areas of this country is of high priority and importance.

However, the health care systems in deprived areas are faced with problems and constraints that need to be considered by relevant authorities. The probable lack of ICT infrastructure, lack or shortage of health staff in the area may be mentioned as the most important limitations. Each of these problems has caused some difficulties for physicians in the fields of diagnosis and treatment and finally has resulted in poor health in these areas.

The other limitations are seen in some issues related to physicians including lack of adequate knowledge of computer systems, information technologies, internet search tools, evidence-based medicine, as well as asking ambiguous and incomplete clinical questions, due to not using PICO forms. These concerns are reinforced by other problems such as lack of appropriate guidelines at the time of treatment, lack of adequate health care facilities, as well as the issues related to distance and cost.

Resolving these problems and limitations primarily involves providing appropriate health facilities and continuous access of physicians to the outcomes and results of the latest advances in medical sciences with the aims of prevention, early diagnosis, effective treatment and clinical decision making.

Due to the nature of their profession and having the knowledge and professional skills in the field of search, clinical librarians could have a significant contribution in improving the quality of public health in all therapeutic areas both near and remote by retrieving and making available the up to date, relevant and reliable medical information.

They can simultaneously use Information technology, telecommunications tools and the methods and tools of clinical practice of evidence-based medicine to interact with experts in medical informatics and make the required resources and tools available to physicians in the right time and place. Therefore, providing better health care services for residents working in remote and deprived areas leads to improved health care. However to accomplish this, clinical librarians should improve their knowledge of English language, online search strategies, basic medication.

Moreover, telecommunication infrastructure and suitable internet speed for online search by librarians are essential.

The most important limitations of this study are the low- speed of internet, sometimes internet disconnection in the workplace, access problems with health centers and attracting the physicians' cooperation in deprived and remote areas and a busy workplace that resulted in asking inadequate questions for the treatment of patients or in delayed contact with the librarian.

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