



Evaluation of Different Hospital Information Systems Software to Meet the Self-Care Management Informational Needs of Patients

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ABSTRACT

Aims Hospital information system may offer a way to increased self-care management. The aim of this study was to determine the patients' informational needs for self-care management and evaluation of different HIS software according to these needs.

Materials & Methods This descriptive cross-sectional study was done during 2011-2012 in Kashan City, Iran at two phases; compiling the required information, and evaluation. The questionnaire items were discussed in three conversation sessions with 20 faculty members by Delphi technique. 15 HIS software provider companies in Iran were selected purposefully and 2 hospitals from each company were participated in the study. Data were analyzed by SPSS 16 software using Chi-square test.

Findings 7 items in the health protection dimension were covered by HIS software; "Need to consult with attending physicians", "Length of disease duration", "Diagnostic and treatment cost resource", "Different treatment approach", "Convenient information recourses", "Offer good information resources", and "Prognosis". No item of health promotion dimension were supported by any HIS software. 6 items in the health maintenance dimension were covered completely by all HIS software; "Blood Sugar", "hct", "hb", "Blood Group Type", "CBC/Diff", and "Electrolytes".

Conclusion Present HIS software can not meet the self-care management informational needs of recently discharged patients and should be improved.

Keywords Information Literacy; Hospital Information Systems; Self Care; Patient Education as Topic

CITATION LINKS

[1] Health literacy and ... [2] Patients' perceptions of ... [3] Development of a ... [4] Effect of self care education on ... [5] Patient-centredness in ... [6] Patient self-management of ... [7] Effect of Carelink, an internet-based insulin ... [8] The effects of communication ... [9] Remote physiological monitoring: clinical, financial, and ... [10] HIT and MIS: implications of ... [11] How can the German Electronic Health Card ... [12] Development of a Tele health Intervention for ... [13] Attitude of inpatients about ... [14] Personal Health Record ... [15] Systematic review: Impact of ... [16] Mobile phone technology in ... [17] The impact of eHealth on ... [18] Internet interventions for ... [19] Patient-centered applications ... [20] Design and ... [21] Developing a web-based information ... [22] Information technology-based standardized ... [23] Seeking help from the ... [24] MySpace as a tool for ... [25] Nursing minimum data Nursing minimum data ... [26] Nursing minimum data ... [27] Telemonitoring for ... [28] Health information management of ... [29] Evaluation of hospital information ... [30] Patient participation in ... [31] Columbia University's Informatics for ... [32] Clinical effects of ... [33] The perceived of ... [34] Respecting to patients' autonomy in ... [35] Utilizing handheld computers to ... [36] Involving the patient: A ... [37] The Importance of ... [38] The impact of an ... [39] Attitude of Inpatients about ... [40] Concepts and applications of ... [41] Application of ... [42] The experiences of ... [43] Communicating about ... [44] Survey on educational needs and ... [45] Self care needs of ... [46] Effect of self-care program on ... [47] Personal health record ... [48] Effectiveness of implementation of ... [49] Effects of self care program on ... [50] Effect of Orem Self Care Model on ... [51] The effect of self-care program ... [52] Effect of self-care education on ... [53] Patient-perceived usefulness and ... [54] Coping with stress in ... [55] A review of the personal health records in ... [56] Personal Health Record ... [57] The effect of educational program based on ...

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Introduction

Self-care management which emphasizes on patients' dedicated role in taking responsibility of their own health and being active participants in their care decisions can empower patients and prepare them to manage their health [1]. Self-care management programs help patients to manage their medical condition in their own living environments [2-4].

Self-care management encompasses a variety of actions and skills that are important for both treatment and prevention of complications [5, 6]. Examples of self-care themes include recognition of disease symptoms, medication use, management of physical and emotional stresses, self-monitoring activities, exercise, diet, smoking cessation and so on [7]. In spite of undeniable evidence on the importance of self-care management, efforts are not still enough [8]. Researchers found that using the information systems promises significant advances in patient care [9].

Health Information Technology (HIT) has been increasingly used and studies on its role in data transfer and health care delivery for patients have grown continuously. HIT which has been described as "the use of a variety of electronic methods for managing information about the health and medical care of individuals and groups of patients"[10] is suggested as a tool to improve healthcare quality, including better management of the processes of care and protection of patient safety [11]. Patient access to these systems can be applied through a simple web page, text message application, and electronic or personal health record [12]. Nowadays, with continued advances in information technology, deployment of hospital information systems (HIS) and patients' access to the Internet in most countries, as well as Iran, patients can play more active role in their health and self-care management. Studies have shown that 42% of Iranian patients are familiar with computers and the Internet, 41.9% of patients have access to the Internet, and 86% trend to get information about their diet using of information technologies or have personal health records [13, 14].

Tele-health has been suggested as a tool to improve healthcare quality [15]. Some

researchers have suggested that using the information systems is favorable, enabling us to create significant improvements in health care and appears to be a beneficial adjunct to patients education for self-care management [11, 16-19]. To assist the acquisition of self-care knowledge, some educational programs using information technology have been provided [20-22]. Data entry in such systems must be done manually which is time-consuming; therefore, it is a barrier to adopt these systems for patients' education. To reduce human errors and save time, it has been suggested that these systems be connected and integrated to hospital information systems [3]. Although these technologies are improving continuously, as new technologies are developing every day, the common feature is that they all allow remote access to a service (e. g., practitioner, nurse and specialist) and provide means of supporting the provision of self management [23, 24].

The aim of this study was to determine the patients' informational needs for self-care management and evaluation of different HIS software according to these needs.

Materials & Methods

This descriptive cross-sectional study was done during 2011-2012 in Kashan City, Iran at two phases; compiling the required information, and evaluation. A questionnaire was made in three "health protection", "health maintenance", and "health promotion" dimensions based on an elementary list of the informational needs for self-care management which was compiled according to reference books and articles [25-28]. The questionnaire items were discussed in three conversation sessions with 20 faculty members of "nursing" and "health care information management" disciplines by Delphi technique. In each session, discussion and exchange of views about self-care management informational needs was done. The elementary list was revised based on experts recommendations and the amount of agreement and disagreement with each item was computed. The 75% or higher agreed items were accepted for self-care management informational needs through hospital information systems and the 50% or lesser agreed items were omitted. Those items

agreed between 50-75% were discussed for session two and same procedure repeated for the third session. The final questionnaire

facial and content validity was confirmed by 4 experts in the field of nursing and health information management.

Figure 1) Evaluation of the potential of 15 HIS software to meet the self-care management informational needs of patients in "health protection", "health maintenance" and "health promotion" dimensions by monitoring 30 hospitals (Only the accepted items were shown and separated by semicolon)

Informational needs	Agreement level by experts		Meet by HISs (%)
	Session 1	Session 2	
Health Protection Dimension			
Need to consult with attending physicians	60	-	93.3
Length of disease duration	100	-	86.7
Diagnostic and treatment cost resource	R	100	46.7
Different treatment approach	80	-	13.3
Convenient information recourses	100	-	6.7
Offer good information resources	60	-	6.7
Prognosis	R	80	6.7
Complications	100	-	0
Need special vaccine; Hypersensitivity to Drugs	80	-	0
Hypersensitivity to Foods; Subjects related to disease	60	-	0
Diagnostic approaches	R	60	0
Health Promotion Dimension			
Rest	100	-	0
Maintain of instrument; Use of instrument methods	80	-	0
Useful food materials; Drug and food restricted; Replacement of instrument; Other educational material related to instrument	60	-	0
Time of instrument use; Periodical control; Proper care for ulcer; Proper care for prosthesis	R	80	0
Period of instrument	R	60	0
Health Maintenance Dimension			
Blood Sugar; hct; hb	100	-	100
Blood Group Type	60	-	100
CBC/Diff	R	100	100
Electrolytes	R	80	100
Need to encounter	R	60	86.66
Temperature	100	-	13.33
Number of encounter	R	60	13.33
BP	100	-	6.66
Pulse	80	-	6.66
Respiratory	60	-	6.66
Patient -centered test; Secondary prevention; Educational consultation programs; Nutritional consult; Use of heart special exercise therapy equipment; Note about minor repair on pacemaker; Job consultation; Range movement evaluation; Reflexes movement evaluation; Sensation and movement test; Recommendation notes; Drug consumption dosage; Drug consumption duration; Drug consumption time; Drug form; Recommendation during consumption; Drug interaction; Daily routine check up for ulcer in diabetic patient; Routine appointments; Educational pamphlet	100	-	0
Group exercise therapy; EKG control; Keep out pacemaker from magnetic; Guideline of use of optical assist instrument; Special educational optical techniques; Type of handicaps; Drug reaction; Time of ease of drug; Drug start date; Tooth-brushing methods; Use of Tooth string methods; Mouth washing liquid; Chewing brittle food	80	-	0
Convenient web site for exercise; Refilling medications; Prescription date; Name of physicians; Drug number; Tooth-paste type; Tooth brush maintained methods; Tooth brushing time	60	-	0
Heart timetable checkup; Use of other prosthesis; Drug way consumption; Use of fluoride for children	R	100	0
Routine tooth checkup	R	80	0
Notify pacemaker before any diagnostic or treatment test; Eye periodical examination; Needs to use of walker and sticks; Drug preparation methods; Food-drug interaction; Date of encounter	R	60	0

R=Recommended by experts

15 HIS software provider companies (Tarahan Boali; Peyvand Dadeha; Rayavarani; Rahavard Rayaneh; Teb va Rayaneh; Tirage Rayaneh; Tarashe Hoshmand; Microafzare Geshm; Tarah Dade Pishro; Sayan Rayan; Hospitals of Mashhad University of Medical Sciences; Poya Samane Diva; Samen Salamat; Poyesh Pardazesh; Tamin) in Iran were selected purposefully for evaluation phase by investigating the references [29]. Considering that each HIS software provider company applies the same software in the hospitals, 2 hospitals from each company were participated in the study (totally 30 hospitals). Data collecting was done by a checklist which was accorded to the made questionnaire and its facial and content validity was accepted by the same experts. The checklist was completed by the researcher through observing HISs.

Data were analyzed by SPSS 16 software using descriptive statistics and Chi-square analytic test.

Findings

HISs were in use at 27 hospitals (90%) and 3 hospitals (10%) used it in pilot mode. Executive program of 22 HISs (73.3%) were Windows-based, 6 HISs (20%) Web-based and 2 HISs (6.7%) DOS-based. HIS was active in all units in 28 hospitals (93.3%) but semi-active in 2 hospitals (6.7%). Physicians had access to complete information in HIS in 19 hospitals (63.3%) and had been trained enough to use HIS in just 5 hospitals (16.7%).

7 items in the health protection dimension were covered by HIS software; "Need to consult with attending physicians" (93.3%), "Length of disease duration" (86.7%), "Diagnostic and treatment cost resource" (46.7%), "Different treatment approach" (13.3%), "Convenient information recourses" (6.7%), "Offer good information resources" (6.7%), and "Prognosis" (6.7%). No item of health promotion dimension were supported by any HIS software. 6 items in the health maintenance dimension were covered completely by all HIS software; "Blood Sugar", "hct", "hb", "Blood Group Type", "CBC/Diff", and "Electrolytes". Only "Keep away assault", "Avoiding airway traveling", and "Having identification card" items which were recommended by experts in the second

session were qualified in the third session by 100% agreement (Figure 1).

There was significant statistical difference between HIS software companies in "health maintenance" dimension ($p < 0.05$). According to the total scores of three dimensions, Hospitals of Mashhad University of Medical Sciences (62.2), Microafzare Geshm (48.9), and Tarahan Boali (44.4) met the above mentioned items of self-care management better than other software significantly (Figure 2).

Figure 2 Comparison of the score of each HIS software in Health Protection (HPT), Health Promotion (HPM) and Health Maintenance (HMT) and total by Chi-square test

Name of Software	HPT	HPM	HMT	Total Score
Hospitals of Mashhad University of Medical Sciences	86.6	0	100	62.2
Microafzare Geshm	46.6	0	100	48.9
Tarahan Boali	33.3	0	100	44.4
Teb va Rayaneh	6.6	0	93.3	33.3
Tirage Rayaneh	53.3	0	46.6	33.3
Rayavarani	13.3	0	100	28.3
Samen Salamat	35.6	0	46.6	27.4
Tamin	13.3	0	53.4	22.2
Tarashe Hoshmand	6.6	0	46.6	17.7
Tarah Dade Pishro	6.6	0	46.6	17.7
Sayan Rayan	6.6	0	46.6	17.7
Poyesh Pardazesh	0	0	43.5	14.5
Peyvand Dadeha	33.3	0	6.7	13.3
Rahavard Rayaneh	6.6	0	6.7	4.4
Poya Samane Diva	6.3	0	6.7	4.3
p value	$p > 0.05$	$p > 0.05$	$p < 0.05$	$p = 0.025$

Discussion

It seems that patients discharged from hospitals needs to access some information related to her disease and information technology can enhance physician-patient communication and encourages patients to self-care management. For years, participation of patients in the care processes with the help of information technology has been accepted as a fact [30, 31]. Based on results of this study, the most importance self-care management informational needs was the health protection information including: prevention of disease and knowledge about disease. In these filed information related to special vaccination, hypersensitivity against drug, educational consultation programs had the most frequency (100%). Our results have emphasized that information about the

nature, symptoms, causes and stages of the disease should be given to patients for better self-care and faster recovery [32, 33] and demonstrated that information technologies can be successfully used in areas of preventive care and management of certain disease, especially in chronic diseases such as diabetes, asthma, heart failure and hypertension [34]. These technologies also can be used to give consult or information related to diseases [35], that patients are satisfied with the use of these systems [36]. But other studies on healthy people or special disease have recommended some other informational needs. One of those studies stated that self-care management informational needs should be included information for improvement of life style, taking care of short time illness, taking care of chronic disease and taking care after hospital discharge [37] or proposed that the patients should be informed of how to take care of themselves against some signs and attacks of disease, process of care and risk factors [34, 38, 39].

These self-care management informational needs were not derived from our results, because we just worked on the self-care management informational needs for anybody who was discharged from hospitals. More studies with the same approach on specific diseases, especially diabetes, leukemia, hemodialysis, arthritis and so on are recommended.

The second basic of self-care management informational needs is health maintenance including laboratory test results, vital data monitoring, rehabilitation, drug information, follow up and dental health information. The most frequency Information needs were information related to drug information and dental health (100%). The present study provides some support for doing studies for patients' access to information about laboratory results [40-42], information about chronic disease monitoring [35], side effects, and symptoms of patient receiving chemotherapy [35, 43]. Fortunately the patients were satisfied with using information technology [36]. The patients had problem with and concern about medical equipments. They also needed to be informed of their application [44]. In respect of drug information, results of numerous studies showed that this information was mostly requested for better

accessibility access. One of the studies reported that the most frequent of data exchange between patients and physicians was medication [45]. To the patients, drug information was very important and had the first priority between all of the medical information needs [39] or methods of operating the equipments [45]. The main Information needs were information related to special vaccination, educational consultation programs, drug information, hypersensitivity against drug, dental health, activities, motion, and exercise (80-100% frequency).

Health promotion including, nutrition, medical equipment, life style improvement, and patient activity were of third importance and this field, the main information needs were information related to nutritional consult, activities, motion and exercise (100%). Surveys have reported that information about mobility, education about life style, manner of activities and mobility, and rest were also needed [32, 33, 46-54]. These findings support the results of present study, but on the other hand, results of other studies revealed that communication between patient suffering from the same disease would lead to better self-care management [55, 56] or propose some other informational needs such as working (75%), social living (72.5%), and family life (83%) [44].

Since the hospital information systems could have applied a good opportunity for self management, it was recommended that repeated evaluation be done on self-care management with hospital information links. Also, acquiring information is inevitable for improving personal health and decreasing the needs and expenses of care services [57].

Our study has some limitations that represent also useful opportunities for future work. First, we had faculty members' views; therefore, future research could investigate patient's view about what data we need. Second, further work should measure actual use of the self-care management using with these information. It is recommended that health care authorities use self care educational methods and support their patients and provide information through hospital information system. Future research could conduct more detailed qualitative analyses of what information patients needs and how patients respond to different

communication channels, media and content as well as the quality of the channels or media to better understand what type of information are more likely to promote self care managements.

Conclusion

Present HIS software can not meet the self-care management informational needs of recently discharged patients and should be improved.

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Ethical Permission: The study was conducted in accordance with the principles of The Helsinki Declaration. All the participants stated that her/his informed constant.

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