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Study the effect of Hospital Information Systems (HIS) on Communication Improvement and Service Quality among Nursing Staff

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Abstract: Failure in communication and information exchange among healthcare personnel can cause cooperative and coordinative problems among them, which finally increases chances of error and decreases the quality of patient care. If Hospital Information Systems (HIS) modifies the work routines and communication pattern among the personnel of different wards, they can play a significant role in providing the patients' safety. The goal of this study is to investigate the HIS's effect on nursing staff communications in different wards and finally on healthcare quality. **Method:** Two years after installation of HIS in Urmia's Shahid Motahari Hospital, a questionnaire was designed to investigate the nurse users' view about the HIS. After reliability and validity of the questionnaire were measured, it was distributed among 150 nurses working in the admission wards of the hospital. From among the questions of the questionnaire, 6 questions were aimed at measuring the major and minor effects of the system on the nurses' important work communications and the major effect of the system on the accuracy of their routine tasks was assessed through one question. A 5-point Likert scale was considered in all of the questions. ANOVA tests were used to analyze the data collected from the questions. The study was an analytic descriptive research. **Findings:** A significant enhancement has been reported by nurses in total index of communication between different parts of hospital (60%) and basic indexes, including ease of accessing to patients' information (test results, radiology, etc.) (69.3%); following-up test results (78%); gathering of discharging information (58.6%); sending orders to laboratory (60%); and following-up prescribed medicine (58%) ($p < 0.05$). Furthermore, in 60 percent of cases a positive effect on enhancing accuracy in doing routine tasks has been reported ($p < 0.05$). **Conclusion:** Our study showed that hospital information system enhancing communication between nurses and increasing accuracy in their routine tasks causes development in nurses' work flow, decreasing probability of mistake, and rising in patient healthcare quality. [Sakineh Aghazadeh, Aloysat Aliyev, Habibollah Pirnejad. **Study the effect of Hospital Information Systems (HIS) on Communication Improvement and Service Quality among Nursing Staff.** *Life Sci J* 2013;10(10s): 307-310] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 51

Keywords: Hospital Information Systems; Communication; Exchange of Information; Nurses; Care Quality

Introduction

Hospitals are divided into different organizational wards with different types of information processing disciplines and different professional healthcare personnel; therefore, there should be mutual communication among organizational wards; and also non-organizational communication should exist. Moreover, due to uniqueness of every patient's healthcare, healthcare organizations need to cope with a lot of coordinative challenges; however, they are not still equipped with technology of work process management in health domain[1]. Failure in communication and information exchange among healthcare personnel can cause cooperative and coordinative problems among them, which finally increases chances of error and decreases the quality of patient care. Therefore, most health centers nowadays use new information management systems like hospital information systems (HIS) in order to integrate the patients' information and modify communication patterns among different hospital wards and the professional

staff. If Hospital Information Systems (HIS) modifies the work routines and communication pattern among the personnel of different wards, they can play a significant role in providing the patients' safety. In fact, it can be said that hospital information systems are big and organized data bases that are utilized to integrate patients' information for the purpose conducting official and administrative undertakings. In hospital information systems, computers and communication devices are used to collect, store, process, and retrieve patients' data and contact between patient care and official information in all hospital activities and also to meet the system users' needs. Hospital information systems should not only support the hospital activities in practical, technical, and strategic perspectives but also protect medical and organizational processes of the patients in separate and integrated way in order to provide them with better service, decrease medical costs, reduce service provision time, minimize medical faults, and document the patients' documents. Now a high quality information system is required to support the

medical process and meet the service receivers' needs. Quality in these systems is mainly related to the customer's satisfaction. Customers inside the hospital information system who are typically called users are more than simple users. They also evaluate the system quality in their daily uses. The users' understanding of the hospital information system is important in evaluating it and their satisfaction is significant in assessing the technical aspects of the system [2]. Nurses are among customers whose presence is essential in the healthcare process in relation to other personnel. In his investigation on nursing personnel's view about the effects of hospital computerized information systems on the care process, Mehdi Kahoei concluded that 55% of the nurses agreed with access to true care information, 50% with ease of checking the prescribed medicine, and 25% with facility of sending the request to the laboratory [3]. Gholamreza Moradi conducted a research on the role of the hospital information system in performance improvement in Mashhad's Doctor Sheikh Hospital. The results of his study showed that the system saved 80% of discharging time (260 minutes) [4]. In an investigation on the effects of a hospital information system on the processing quality of nursing information according to the nurses' views, Elske Ammenwerth (2011) found that better and complete access to nursing documentations, better evaluation of the patients, better legibility of nursing documentations, reduction in the number of duplicate documents and documents, better protection of work process through checklists and list of tasks were all significantly achieved after the system had been installed [5]. Due to increasing tendency of the hospitals to install computerized information systems and allocated budgets of tens of millions and also the fact that personnel of clinical wards account for the majority of inside customers of these systems, their motivation for and viewpoint about utilizing computers in hospital information systems in care and medication processes can be investigated by collecting and analyzing their views. The present study was aimed at investigating the effects of HIS on both the communication between nursing staff and other wards and the quality of patient care according to the nurses' viewpoints.

Method

The present research that is a descriptive analytical study investigated the admission ward nurses' viewpoints about the hospital information system in Shahid Motahari Medical Education Center, Urmia. After holding justification classes in 2009, this center attempted to change its hospital

information system. The present study was conducted two years after the hospital information system had been installed. To let the participants make a good judgment about the installed software in their workplace, it was decided to select those individuals who had been working in admission wards of the hospital before the system installation as the subjects. Therefore, first a list of the nurse staff that had a work experience of more than two years was retrieved from the nurse office in Shahid Motahari Medical Education Center. Thus, 150 nurses and staff of admission wards such as NICU, newborns, children 1, children 2, children 3, Kosar surgery, children blood, midwifery, children surgery, and ICU were randomly selected. Data were collected through a questionnaire that was aimed at eliciting the nurses' viewpoints about using the computerized information system. Validity of the questionnaire was assured through scrutinizing similar scientific studies and consulting with the field professors, experts, and nurses. And its reliability was calculated to be 0.87 through Cronbach's alpha test. The personnel's viewpoints about the effect of hospital information system on the communication between nursing staff and improvement of patient healthcare were classified into five categories: it has been much more difficult, it has been more difficult, it has not changed, it has been a little easier, and it has been pretty easier. A score between 1 to 5 was regarded for the individual's response to every question. Data classification was carried out through descriptive statistical methods and they were analyzed through X^2 test on significance level of 0.05.

Results

The present study was conducted on 150 personnel of different wards. Subjects were consisted of 147 nurses and 3 midwives. Three subjects had master's degree and the rest 147 had bachelors. Most of the nurses were very satisfied with the new information system in this regard that they could find the patient's information (examination results, radiology, etc.) very easily. 78% and 60% of the nurses were respectively satisfied with following-up the results of the examinations and sending the requests to the laboratory. They stated that these tasks had become very easy. They believed that with installation of the new system, sending the documents to the laboratory and receiving the results of the examinations were much easier than before because requests were recorded on the computer and at the same time they were available in the laboratory ward and vice versa; that is the results were available as soon as they were recorded on the computer in the laboratory.

Table 1. Viewpoint of Clinical Nursing Personnel in Shahid Motahari Hospital about the Effects of the Hospital Information System (HIS) on Improvement of Communication and the Nurses' Work Quality

Viewpoint/Characteristics	It has been much more difficult.	It has been more difficult.	It has not changed.	It has been a little easier.	It has been pretty easier.	Total
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
Finding the patient's information (examination results, radiology, etc.)	0	(1.33)2	(2)3	(27.3)41	(69.3)104	(100)150
Pursuing the results of the examinations	0	(0.66)1	(0.66)1	(20.6)31	(78)117	(100)150
Collecting discharge information	(0.66)1	(1.33)2	(4.66)7	(34.6)52	(58.6)88	(100)150
Sending request to the laboratory	0	(1.33)2	(8.6)13	(30)45	(90)60	(100)150
Pursuing the prescribed medicine	0	(2.66)4	(10.66)16	(28)42	(58)87	(100)150
Increasing preciseness in daily task accomplishments	(4)6	(4.66)7	(5.33)8	36(54)	(50)75	(100)150
Creating communication among different wards of the hospital	(1.33)2	(2.66)4	(0)0	(36)54	(60)90	(100)150

Most of the nurses (58%) believed that checking the prescribed medicine had become much easier. They believed that this easiness was due to two issues: first, improvement in communication between the medical center and the central pharmacy and second, deletion of wasted time by service staff of the central pharmacy while checking the prescribed medicine. 58.6% of the nurses claimed that discharging information collection had highly facilitated. They believed that in the paper system, completing the patient's document and sending it to the discharging ward had been a long process including: completing the document in the related ward in order to dispatch it to the wards of laboratory, pharmacy, radiology, and finally discharging for ponying-up, which usually took a long time. In the new information system; however, these processes are deleted and the document is directly send to the discharging ward. Data analysis proved a positive effect of the system on improving task accomplishment preciseness in 60% of cases ($p < 0.05$). Moreover, statistical analyses showed a significant correlation between major criterion of communication among different wards of the hospital and its minor criteria ($p < 0.05$).

Discussion

The results of the study showed that 69.3% of the personnel agreed with the ease of access to the patients' information in the new system. In a similar study conducted in Australia, this figure was reported as 95% [6]. Elske *et al* conducted an investigation the results of which showed that installation of a new information system facilitated access to the information [5]. In his study conducted in Semnan,

Kahooei reported a figure of 10% for this case [3]. It seems that the observed difference between the reported figures is due to the way the information systems are used and the type of input and output information they are given. In this study, since patient's information was taken as the results of the experiments, radiology response, demographic profile, initial diagnosis, the doctor's name, type of insurance and prescribed medicine; therefore, satisfaction level was higher while in Kahooei's study, focus was mainly on access to the results of the clinical reports. As a result the reason for low satisfaction in his study was due to the fact that only one computer was available and other portable devices (handheld and pen computers, portable ones or sound detectors or information record through touch screens) were not utilized.

The results of the study showed that 60% of the users agreed that sending request to the laboratory was easier and 78% of them stated that pursuing the results of the experiments was easier. These figures in a similar study conducted in Semnan were respectively reported as 25% and 10% [3]. The users stated that in the previous system they had to wait until the orders were recorded in the examinations' notebook by the doctors then after the sample had been taken, it was taken to the laboratory by the service staff and they had to wait to get the result of the examination and delivered it to the related ward. However, in the new system these processes were omitted; that is the examination requests were recorded in the computer and immediately accessible in the laboratory. The results of the examinations were also immediately accessible in medical wards after they were recorded on the laboratory's

computer. Therefore, the wasted time by the service staff on the way to the laboratory and vice versa was omitted and quick access to the results of the examinations was provided.

The results of the study showed that 58.6% of the users stated that discharging information collection had become much easier. In the study conducted by Kahooei in Semnan, the results showed that 15% of the users claimed that doing this task was much easier [3]. In a study conducted by Moradi *et al*, the results showed that after the new information system installation, 80% of discharging time (260 minutes) was saved [4]. All of these results show that the new system has resulted in improvement of communication between the wards involved in the processes of discharging, omission of wasted time in each ward while calculating medical undertakings and their costs, and facilitation and acceleration of the processes. 50% of the personnel believed that the new information system enhanced preciseness in accomplishing daily tasks. In his study, Kahooei showed that 45.8% of the staff believed that their work faults would decrease by using this system [3]. In their study, Amiri *et al* concluded that managers and users in evaluating themselves believed that using HIS resulted in increase in the individuals' work preciseness, work facility, decrease in repetitive tasks, increase in work speed, improvement in work quality, improvement in communication between wards, and optimal usage of time [7]. The results of the study conducted in Hormozgan by Haghghi *et al* showed that 32.8% of the personnel agreed with enhancement of work accomplishment [8]. The results of the study showed that 60% of the staff agreed with improvement of communication between different wards of the hospital. Findings of the study are in line with those of the study conducted by Amiri. The results of their study showed that using HIS can improve communication between wards and decrease the personnel's commuting.

Conclusion

The present study showed that the installed hospital information system (HIS) could improve the personnel's work process, decrease the chances of fault, and increase the quality of healthcare, all through improving communication in the nurses' work and increasing their preciseness in daily tasks.

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