EVALUATION OF HOSPITAL INFORMATION SYSTEMS IN SELECTED HOSPITALS OF IRAN

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ABSTRACT

Due to the information systems objectives, and to avoid duplication and to help improve care quality and reduce cost, it is necessary to conduct continuous evaluation to determine how to achieve these goals. This study was performed using evaluation indices of hospital Information systems (HIS) in selected hospitals of Iran. In this article organizational and server components of hospital information systems in selected hospitals are being assessed.

This research is a descriptive cross – sectional study. The study population consisted of the information system of Shohaday Tajrish, Khatamolanbiya, Imam Khomeini and Milad Hospital. Data collecting tools were checklist of hospital information system Evaluation Index, which completed with direct observation and interviews with users. Data analyzed by statistics software SPSS, and presented as statistical tables and graphs.

In the studied hospitals, although the most of the organizational components subgroups and hospital information system server components has been set up and used but pharmacy information system, decision support systems, communication services and telemedicine services hadn`t been set up fully in the hospitals. Currently most subtypes of organizational components and hospital information system server components were fully in the designed software and considering all fields in 5 hospitals.

KEYWORDS

Assessment Index, Evaluation, Hospital, Hospital Information System

1.INTRODUCTION

Nowadays, due to the development of health information systems in health care centers, using equipment, software, and applications of these systems has also increased [1].Use of Hospital Information Systems is one concern in the health sector because of their increasing needs of the

growing complexity of health management processes and also due to the significant diversity and innovation in the supply system [2].

In general, the goal of health care information systems including hospital information systems is management of information, which health care staffs need for their efficiency and effectiveness of tasks and activities. Hospital information systems must be capable to support the high-quality health care services and meet the needs of its people [3].

Recently, due to the broad applications of ICT (Information and communication technology) in health systems, there is pressure on organizations` decision makers for the purchase and installation of these systems. However, it is rarely to discuss about the advantages and shortcomings of these technologies, because implementing information technology systems is often for utilizing the technology, regardless of the actual needs of the community [4]. Appropriateness of hospital information systems with healthcare practitioners` Work Programs cause that the expertise activities be easy for these practitioners [5].

On the other hand, if the design of hospital information systems be detailed, the effectiveness and productivity of health care occupant and patients` satisfaction will be increased and health care costs will be reduced [6]. In other words, non-compliance of hospital information system functions with existing processes can affect the cost and quality of health care. Therefore, due to the objectives of information systems, and to avoid duplication and to enhance quality and reduce costs, it is necessary to perform continuous assessment of hospitals information system software [7].

One of the important aims of the Hospital Information System software evaluation is promotion of these programs according to the Ministry of Health criteria, which continuously have been developed based on current needs and is notifying to the developer Company and universities [8]. Unfortunately, most of the software has been made due to the requirement of customer demand and not on the basis of a rational holistic and systemic approach. Also, different views affect the definition of hospital information system components that these different perspectives, derived from different needs of stakeholders or users of the system [9].

So, according to the adoption of hospital information systems in teaching hospitals in Iran and researchers` early familiar with these systems, the researchers went on to use "integrated hospital information system evaluation criteria", which was approved and published in 2011 by the Ministry of Health and Medical Education. We use these indices for evaluation of hospital information systems in selected hospitals in Iran, and by determining their weaknesses and non-compliance pointes help indicators and administrators for reform and more consistent with the evaluation criteria. Because by identifying needs, the way of solving problems and developing Hospital Information System will be paved, ultimately it is hoped that the quality of health care provided to patients will improve.

2.METHODS

Considering that the aim of this study was to evaluate hospital information systems, so among the hospitals in Tehran, hospitals were selected that had more perfect information systems are than others. Therefore, the study sample includes information system of Shohadaye Tajrish, Rasoole Akram, KhatamAlanbiya, Emam Khomeyni (5 hospitals and 100 information systems).

The data collecting method was in this way that researcher referred to selected hospital and completed the checklist by direct observation and interviews with system users (130 people of 150 users were willing to interview). The data gathering tool in this study was hospital information system evaluation indexes checklist (list) of Health and Medical Education Department, which the checklist includes 9 enterprise (organizational) components and 11 hospital information system server components, along with the main subgroups and also their subsidiary subgroups. In this study, each of these subgroups has been considered as a feature that existence, lack and designing have been studied in the future of these features.

Like all methods of evaluation, according to the identified evaluation cases in a framework, they were given expert rating, in other words, they weighted from 1 to 10, that qualitative indicators were converted to quantitative and metric indices. To complete this framework, we referred to selected hospital and completed the checklist by direct observation and interviews with system users, that the data collected and after scoring, were analyzed and results were extracted. The data analyzed by statistics software SPSS, and presented as statistical tables and graphs.

3.RESULTS AND DISCUSION

a.Evaluation results of the organizational components

Evaluation results of the organizational components(including admission information systems, outpatient information systems, hospital wards information system, laboratory information systems, radiology information systems, operating room information system) showed that currently most of information systems were fully in the designed software and considering all fields in 5 hospitals. The only thing can be noted here is that, in pharmacy information system the average percentages of the features that wasn't in the software package and it was supposed to be considered in future versions of the software are more other two features (30out of70 cases, 42.8%) (See table 1).

Table1: The total number and percent of pharmacy information system subgroups evaluation

Hospitals	Feature Of Software Packages	Number	Percent	Description Of Features
Shohadaye Tajrish	√	4	28.6	☑Currently this Features fully in designed software and by considering all the fields.

∗This Feature currently found in standard software packages, but changes are needed to achieve the above.

☒This Feature is not available on software package and will be considered in future versions of the software |
	∗	-	0	
	×	10	71.4	
Khatam Alanbiya	√	8	57.1	
	∗	4	28.6	
	×	2	14.3	
Emam Khomeiny	√	2	14.3	
	∗	4	28.6	
	×	8	57.1	
Hazrat Rasool	√	8	57.1	
	∗	4	28.6	
	×	2	14.3	
Milad	√	2	14.3	
	∗	4	28.6	
	×	8	57.1	
All the hospitals	√	24	34	
	∗	16	23.2	
	×	30	42.8	

Also, the average percentage of the characteristics was significant in the information system of medical records (4 out of 15 cases, 26.7%) and discharge (30 out of 100 cases, 36.2%). In other words, all of the subgroups of pharmacy information system, medical records information System and discharge information system haven`t been set up fully in the hospitals (See table 2).

Table 2: Percentage of organizational components

Organizational Components	Checklist Options			Total
	√	*	×	
Admission Information System	70	11.8	18.2	100
Outpatient Information System	88	0	12	100
Hospital Wards Information System	60	20	20	100
Pharmacy Information System	34.3	22.9	42.8	100
Laboratory Information System	68.7	12.2	19.1	100
Radiology Information System	72.5	15	12.5	100
Operation Room Information System	83.8	11.1	5.1	100
Medical Records Information System	60	13.3	26.7	100
Discharge Information System	42.5	21.3	36.2	100

b.Evaluation results of server components

Evaluation results of the server components (including Electronic Medical Records, Nursing Information Systems, Bed Management Information Systems, Terminology Services, Security Services, Staffing and Scheduling Information Systems, Resource Management Information Systems, Nutrition Information System) showed that currently most of information systems were fully in the designed software and considering all fields in 5 hospitals. Only the decision support systems, communication services and telemedicine services, the average percentages of the features that weren't in the software packages of studied hospitals and it was supposed to be considered in future versions of the software are more other two features (see table 3). Also, in the terminology service, average percentage of a feature that has been present in standard software packages but the changes were needed to achieve the above, was impressive(12 out of 30 cases, 40%)(See table 4).

Table 3: Percentage of server components

Server Components	Checklist Options			Total
	√	*	×	
Electronic Health Record	67.1	19.1	13.8	100
Nursing Information System	65	12.5	22.5	100
Bed Management Information System	44.4	26.7	28.9	100
Scheduling Information System	80	12	8	100
Decision Support Information System	12.5	25	62.5	100
Terminology Services	60	40	0	100
Security Services	72.3	15.4	12.3	100
Communication Services	17.7	20	62.3	100
Telemedicine Services	13.3	13.3	73.4	100
Resource Management Information System	52	18	30	100
Nutrition Information System	60	16	24	100

Table4: The total number and percent of terminology service subgroups evaluation

Hospital	Feature Of Software Packages	Number	Percent	Description Of Features
Shohadaye Tajrish	√	4	66.7	☑Currently this Features fully in designed software and by considering all the fields. ∗This Feature currently found in standard software packages, but changes are needed to achieve the above. ☒This Feature is not available on software package and will be considered in future versions of the software
Shohadaye Tajrish	∗	2	33.3	
Shohadaye Tajrish	×	0	0	
Khatam Alanbiya	√	3	50	
Khatam Alanbiya	∗	3	50	
Khatam Alanbiya	×	0	0	
Emam Khomeiny	√	4	66.7	
Emam Khomeiny	∗	2	33.3	
Emam Khomeiny	×	0	0	
Hazrat Rasool	√	3	50	
Hazrat Rasool	∗	3	50	
Hazrat Rasool	×	0	0	
Milad	√	4	66.7	
Milad	∗	2	33.3	
Milad	×	0	0	
All the hospitals	√	18	60	
All the hospitals	∗	12	40	
All the hospitals	×	0	0	

Hospital information systems support medical and clinical staff in their daily activities by means of electronic data processing exchanging. These systems cover subsystems in both inpatient and ambulatory care, so, they must be fully and complete. According to the results of the study it is possible to conclude that, currently most subgroups of organizational components and hospital information system server components were fully in the designed software and considering all fields in 5 hospitals. The only exception cases were pharmacy information system, decision support systems, communication services and telemedicine services, which some of their subgroups weren't in the software packages of studied hospitals and it was supposed to be considered in future versions of the software.

Similarly, the result of Salmela and Turunen study showed that the framework for evaluating medical alert systems benefits researchers. Its contribution is as a new means to help them study the impacts of such systems in clinical decision making. Practitioners can use the framework to review the potential benefits of alert systems in their own hospital. They can establish objectives for implementing such systems. And they can use the framework as an investigative tool in analyzing reasons for low organizational impact of an implemented alert system [10].

Also, the result of Ammenwerth et al study showed that a broadly accepted framework for evaluation of IT in healthcare seems desirable to address problems. Such a framework should help to formulate relevant questions, to find adequate methods and tools, and to apply them in a sensible way. Evaluation studies in health care IT take a lot of time, resources, and know-how.

Research in the area of health care IT evaluation is just beginning. It is still mostly unclear how 'good' information systems should look like. Clearly defined methodological guidelines which take the difficulties of information system evaluation in health care into account may help to conduct better evaluation studies [11].

All of the healthcare organizations wants to provide accurate and timely health care for their customers and therefore, given the widespread use of hospital information systems and their dramatic impacts on healthcare provide and patient treatment, giving attention to all the features of hospital information systems and their inclusion in the software packages and focus on the organizational and server components of HIS (Hospital information systems) is recommended.

4.CONCLUSION

The main and subsidiary subtypes of organizational components and server components currently exist in all fields in the 5 hospitals software except pharmacy information systems, decision support systems, communication services and telemedicine service, that in these systems the average percentages of the feature: "This feature there is not currently in designed software and will be implemented in future versions of the software" more than other features. Due to the widespread adoption of hospital information systems in healthcare organizations, significant impact on patient treatment and according to the study results, the following suggestions are recommended:

1. Emphasize on characteristics that required for the implementation of HIS software
2. Evaluation of HIS in healthcare organizations
3. More focus on organizational and server components of HIS

5.ACKNOWLEDGMENTS

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