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Evaluation of hospital information systems of the teaching hospitals affiliated to Shiraz University of Medical Sciences, based on the American College of Physicians Criteria

E Emami[1], R Sharifian[2*], H Sotude[1], A Nourmohammadi[1], Z Asemani[3]

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ABSTRACT

Introduction: Hospital information system (HIS) is a computerized system used for management of hospital information as an electronic device and has an indispensible role in the field of qualified healthcare services. Nevertheless, compared to other industrial and commercial systems, this information system is lagged in using the information technology and applying the controlling standards for satisfying the customers. Therefore, the present study aimed to evaluate HIS, identify its strength and weak points, and improve it in the teaching hospitals affiliated to Shiraz University of Medical Sciences, Shiraz, Iran.

Method: The present descriptive, cross-sectional study was conducted in the 8 teaching hospitals of Shiraz University of Medical Sciences which used HIS in 2011. The study data were collected through interview and direct observation using the criteria of American Physician College check-list. Finally, SPSS statistical software was used to analyze the data through descriptive statistics.

Results: The study results showed that laboratory and medical records had respectively the most %43.5 and the least %21.03 conformity to the criteria of American College of Physicians. Also, Faghihi and Zeinabiye hospitals respectively had the most %41.8 and the least %25.2 conformity to the American College of Physicians' criteria. In pharmacy, data entrance mechanism and presentation of reports had complete conformity to the scales of American College of Physicians, while drug interactions showed no conformity. In laboratory, data entrance mechanism had complete conformity to the above-mentioned criteria and keeping the test history had %87.5 conformity. The possibility of receiving information from centers out of laboratory had no conformity to the desired criteria. In the radiology department, data entrance mechanism had complete conformity to the above-mentioned criteria and keeping the test history had %87.5 conformity. Besides, the possibility of receiving information from centers out of radiology department had %25 conformity. In medical records department, data entrance mechanism had complete conformity to the criteria and data storage, files format, and the process of providing backup had %75 conformity.

Conclusion: The final conformity of HIS in the study hospitals showed that the total mean of the system was less than %50 and weak. Therefore, further studies are required to be conducted throughout the country; so that various providers will be able to evaluate the presented systems regarding compatibility and interoperability.

Keywords: Hospital information system (HIS), Evaluation, Educational hospitals, American physicians college

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Introduction

Hospital information systems (HIS) are computerized systems used by hospital information management as an electronic tool, playing an important role in the quality of healthcare services (1).

Nevertheless, compared to other industrial and commercial systems, this information system is lagged in using the information technology and applying the quality standards for satisfying the customers. Of course, this is quite natural since HIS is somewhat new in our country (2). However, it is not possible to make sure about the quality of the system without taking internationally accepted norms and standards into account. American College of Physicians (ACP) is one of the reliable resources whose activities and achievements have been approved at

[1]*Library and Information Sciences Department, Shiraz University, Shiraz, Iran*

[2]*Health Human Resource Research Center, School of Management & Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran*

[3]*Library and Information Sciences Department, Yazd University, Yazd, Iran*

*Corresponding Author: ***Roxana Sharifian,*** *Health Human Resource Research Center, School of Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran, Tel: +98 (711) 23407774 , Email: Sharifianr@sums.ac.ir.*

the international level. The achievements of the college include publishing the criteria for evaluating the systems and assessing various features of HIS in various parts of the hospital (3).

Despite the importance of hospital information systems in health information management, service efficiency, and convenience of the patients as well as the medical staff, there is little information about the status of these systems in Iran and, particularly Fars province.

Overall, the variety of the systems approaches of various teaching and research centers toward these systems, performance of such systems, and their compliance with the international standards are among the highly sensitive information which helps us evaluate the systems' success rate, implementation, improvement, and productivity.

Therefore, the present study aims to assess, identify the strong as well as the weak points of, and improve HIS in the hospitals affiliated to Shiraz University of Medical Sciences, Shiraz, Iran (3).

Abedian and Bitaraf (2010) conducted a study entitled "Presenting a model for assessment of hospital information systems in Iran" and expressed the objectives of assessment of HIS in various fields, such as functional goals and efforts for improving technology in the field of health in Tehran. The results of this study showed that evaluation of HIS had benefits for hospital management system leading to increased quality of the services, updating the hospital information system based on the users' needs, and increased level of mechanization of the hospital processes (4).

Table 1. Constituent parts check list

	Section	Number of items
1	Features of pharmacy software	32
2	Features of lab software	25
3	Features of radiology software	25
4	Features of phone call software	21
5	Features of clinical department software (Diagnosis)	18
6	Features of clinical department software (Reference)	26
7	Features of clinical department software (Preventive medicine)	23
8	Features of clinical department software (Clinical engagement)	18
9	Features of clinical department software (Patient education)	11
10	Features of managed care software	32
11	Features of medical records software	82

In a study entitled "Degree of observing the criteria of American College of Physicians regarding the hospital information systems in the teaching hospitals of Iran, Tehran, and Shahid Beheshti Universities of Medical Sciences", Azizi et al. (2010) investigated the hospitals affiliated to Iran, Tehran, and Shahid Beheshti Universities of Medical Sciences(5). The means of %39.7, %39.3, and %36.8 show that the compliance rate of the pharmacy department was weak in all hospitals of three universities. Moreover, the means of %36.4, %36.8, and %37.7 were obtained in the radiology department, which shows the weak conformity in all the three University hospitals. Weak conformity was also observed in the laboratory revealed by the means of %38.3, %37.2, and %29.8 (5).

In a study entitled "The role of hospital information systems in healthcare services in Hungary", Feko (2010) stated that in case health information systems are implemented, delivering healthcare services will be more reliable. Hungary's hospitals make use of various information systems which cause lots of problems in data exchange. In fact, information systems are able to communicate within the hospitals, but their communication ability is limited outside the hospital (6).

Garrib et al. (2008) conducted a research entitled "Evaluation of hospital information systems in rural areas" in South Africa, showing that a lot of work is carried out by the health staff in order to collect and compare the data. In all the centers there, the data are copied and kept. The research results showed that the process of data collection was performed efficiently in those centers; however, there were some problems regarding data analysis, interpretation, and application (7).

Methods

The present descriptive, cross-sectional study was conducted in the 8 teaching hospitals of Shiraz University of Medical Sciences, Shiraz, Iran which used HIS in 2011. The study data were collected through interview and direct observation using the criteria of American College of Physicians (ACP) check-list.

Regarding the levels of implementation in the hospitals, the systems are divided into three categories:

Advanced: HIS is implemented in all departments and units:

1. Administration affairs
2. Support units
3. Para-clinical departments
4. Clinical departments

Medium: HIS is implemented in the following units:

1. Administration affairs
2. Support units
3. Para-clinical departments

Primary: HIS is implemented in the following units:
1. Para-clinical departments
2. Support units

The study data were analyzed in SPSS statistical software using descriptive statistics. The compliance rates of %70, %50-70, and below %50 were considered above average (good), average, and poor, respectively.

Results

The findings showed that most educational hospitals of Shiraz were equipped with hospital information systems. Most hospitals %50 had bought the hospital information system software from Index Systems Analysts Inc. In fact, 6 out of the 8 hospitals equipped with this system had purchased the software from Fars province, while Nemazi and Shahid Chamran hospitals had purchased their software from Tehran.

The study results also showed that HIS was not implemented in the advanced level in any of the hospitals. It had been implemented in the medium level in %62.5 and in the primary level in %37.5 of the hospitals.

According to the results, the laboratory section with 43.5% and medical records department with %21.03 had respectively the highest and the lowest compliance with the criteria of ACP in the educational hospitals of Shiraz University of Medical Sciences. As shown in Table 2, the rate of compliance was weak in all four sectors of pharmacy, laboratory, radiology, and medical records (<50).

Table 2. Status of the educational hospitals of Shiraz regarding the companies producing hospital information systems and the level of implementation

Hospital	Software producing company	Level of implementation
Nemazi	Rayavaran Development (Tehran)	Average
Shahid Faghihi	Analysts System (FARS)	Average
Shahid Chamran	Smart (Tehran)	Average
Zeynabiyeh	Rayavaran Development (Shiraz)	Primary
Hafez	Rayavaran Development (Shiraz)	Primary
Khalili	Rayavaran Development (Shiraz)	Primary
Ebnesina	Shiraz University of Medical Sciences	Average
Shahid Dastgheib	Shiraz University of Medical Sciences	Average

Moreover, pharmacy department of Khalili and the Ebnesina hospitals with %50, laboratory division of Dastgheib hospital with %60, radiology department of Zeynabiyeh hospital with %44, medical records department of Nemazi hospital with %34.1, and clinical department (diagnostic features) with %33.3 had the highest conformity to the criteria of ACP.

Table 3. Conformity of the features of HIS in the educational hospitals of Shiraz University of Medical Sciences with ACP criteria

Compliance	Unit name	Hospital name
25	Pharmacy	Hafez
36	Laboratory	
36	Radiology	
9.8	Communications and infrastructure (medical records)	
50	Pharmacy	Khalili
40	Laboratory	
20	Radiology	
25.6	Communications and infrastructure (medical records)	
50	Pharmacy	Ebnesina
40	Laboratory	
40	Radiology	
18.3	Communications and infrastructure (medical records)	
37.5	Pharmacy	Shahid Dastgheyb
60	Laboratory	
36	Radiology	
30.5	Communications and infrastructure (medical records)	
40.6	Pharmacy	Nemazi
44	Laboratory	
36	Radiology	
34.1	Communications and infrastructure (medical records)	
33.3	The clinical (diagnostic)	
46.9	Pharmacy	Shahid Faghihi
56	Laboratory	
40	Radiology	
24.4	Communications and infrastructure (medical records)	
46.9	Pharmacy	Shahid Chamran
44	Laboratory	
20	Radiology	
15.9	Communications and infrastructure (medical records)	
18.8	Pharmacy	Zeynabiyeh
28	Laboratory	
44	Radiology	
9.8	Communications and infrastructure (medical records)	

Also, pharmacy, laboratory, and medical records sections of Zeynabiyeh hospital with %28.8, %18, and %9.8, respectively and the radiology department of Shahid Chamran and Khalili hospitals with %20 had the least conformity to these criteria. The medical records department of Hafez hospital with %9.8 had also the lowest compliance with the standards of ACP.

Shahid Faghihi hospital with %41.8 and Dastgheyb hospital with %41 had the highest conformity and Hafez hospital with %26.7 and Zeynabiyeh hospital with % 25.2 had the lowest compliance with the standards of ACP.

According to Table 4, compliance rate was poor (<50) in all the teaching hospitals of Shiraz University of Medical Sciences, Shiraz, Iran.

Table 4. Compliance rate of hospital information systems in the study hospitals with ACP criteria

	Hospital System	Compliance
1	Shahid Faghihi	%41.8
2	Shahid Dastgheyb	%41
3	Nemazi	%38.7
4	Ebnesina	%37.1
5	Khalili	%33.9
6	Shahid Chamran	%31.7
7	Hafez	%26.7
8	Zeynabiye	%25.2

Discussion

The existence of subsystems of Para- clinical information in all hospitals can demonstrate the importance of these subsystems in different medical activities and processes. This was also confirmed by (5, 8). Subsystems of clinical data have some applications, but due to the lack of proper infrastructures in financial, technical, and communication areas, many centers and hospitals are not able to apply and implement these subsystems. Therefore, it is essential to cooperate with the treatment centers in order to build a hospital information system using new technology to deliver health services more effectively and efficiently. Furthermore, there are various information systems in different hospitals and using different systems leads to the use of different forms in the hospitals. Thus, the scattering data in such a system not only results in inconsistency in providing information for decision making, but it also withdraws the power and accurate planning of the macro-planners of health programs. To prevent this, compatibility between different programs and interoperability is quite necessary. A large number of ACP criteria have not been taken into account in the studied systems. In fact, it seems that the criteria not considered in these systems have been mainly dealing with more complicated functions; as a result, these systems are only used for primary goals (9, 10).

Azizi and colleagues (2010) have also reported similar results. In their research in the teaching hospitals of Iran, Tehran, and Shahid Beheshti Universities of Medical Sciences, they showed that the highest and the lowest conformity in the pharmacy was related to providing reports and maintaining drug information, respectively(5). In the laboratory as well as the radiology department, the highest and the lowest conformity were related to reporting and panel formation, respectively.

Conclusion

Finally, in medical records department, the highest compliance was related to data transfer, while the lowest compliance belonged to supporting a variety of data formats. Overall, the results showed that the compliance rate of hospital information subsystems is weak.
Regarding the fact that the compliance rate was below 50% in all the teaching hospitals of Shiraz University of Medical Sciences, they have a weak conformity to the criteria of ACP.

The results of the present study showed that the hospital information systems of the teaching hospitals of Shiraz University of Medical Sciences had a weak conformity to the criteria of ACP. Considering the growing importance and use of the information systems, the authorities need to develop appropriate criteria and standards in this regard and assimilate the information systems with those standards. Further research is also recommended to be performed throughout the country in order to investigate the compliance and interoperability of the systems presented by different providers.

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