Original Article

Formative evaluation of Hospital Information System According to ISO 9241-10: A case study from Iran

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Abstract:
Introduction: Today, different information systems are operated in hospitals in Iran to manage the admission, discharge, radiology, pharmacy, accounting and other procedures. Inappropriate HIS system causes wasting of time, consumption of more energy and increasing the costs.
Methodology: This study was conducted in Dr. Ali Shariati Hospital in Iran. We employed Isometric Formative Evaluation questionnaire to analyze the hospital information system. Also, interviewing method was applied to complete information from departments' officials.
Results: From 101 people under investigation in this study, it was agreed on 27 people (26.7%) suitability for task criteria, 46 people (45.5%) by controllability criteria, 27 people (26.7%) to suitability for individualization criteria, 69 people (68.3%) to suitability for learning criteria, 41 people (40.6%) by error tolerant criteria, 46 people (45.5%) by self description criteria, 53 people (52.5%) by conformity whit user expectation of Hospital Information System in Dr. Ali Shariati Hospital.
Conclusion: Findings indicate Hospital Information System criteria are not efficient. It is necessary either to use nationally applicable software in information system of Medical Sciences Universities across the country or different software having international standards of medical information should be used.

Bibliographic Information of this article:

Keywords: Hospital Information System (HIS); Formative evaluation; Standard; ISO 9241-10

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1. Introduction

Information Technology (IT) has the potential to improve the quality, safety, and efficiency of health care. Diffusion of IT in health care is generally low (1). Hospital information system is one of the most common systems that is designed to support provided services by healthcare service providers. This system enhances quality of health and care data, increasingly. This computer database is used to create communication, store health information and manage information (2-4). Therefore hospital information system (HIS) is a comprehensive, integrated information system designed to manage the administrative, financial and clinical aspects of a hospital. As an area of medical informatics, the introduction of a HIS into a hospital was purported to reduce the time spent on administrative and clinical activities by electronic data processing. However, adoption has been slow, and a key concern has been that staffs will require more time to complete their work using HIS. And also Most available HIS have lots of deficiencies in data gathering, so hospital managers decided to keep their paper records and same time use HIS (5, 6).
During the past 10 years, the validity of computerized information systems for several departments has been widely reported. The impact of electronic medical record systems on primary care, pediatrics, intensive care units and radiation oncology have been analyzed (7, 8, and 9), and the effects of a HIS on Medical Records department staff was undeniable (10). So far, evaluations of HIS have been undertaken focusing mainly on financial aspects or considering the patients interests. A major aspect has been neglected: The user! Nurses, physicians and other healthcare employees, working with the software, spend a lot of time each day by filling in forms, reviewing medical inspection results and handling an amount of information for administration needs (11). The aim of the study was to perform a formative evaluation of Hospital Information System According to ISO 9241-10 in Dr. Ali Shariati Hospital in Bandar Abbas, Iran.

2. Materials and Methods

This descriptive-analytical study used standard isometric questionnaire 9241 to investigate whether hospital information system of Dr. Ali Shariati hospital can meet user requirements and have necessary usability. Part 10 of this standard is about investigation of system's usefulness. Statistical population of study composed of all personnel in Dr. Ali Shariati hospital in Bandar Abbas. In other word, this study used Yaman formula and information was gathered by presenting and distribution of isometric standard questionnaire (suitability for the task (15 questions), self-descriptiveness (12 questions), controllability (11 questions), conformity with users expectations (8 questions), error tolerant (15 questions), suitability for Individualization (6 questions), suitability for learning (8 questions)) that its reliability and validity were approved. Concerning first part of questionnaire some questions is available in short isometric that reliability and validity of questionnaire were approved in Alipour and Shahmorad's research (12, 13). In addition, questionnaire related to hospital information system was used to better identification of hospital information system of Dr. Ali Shariatihospital. Data analysis was done using descriptive test (such as frequency and percent for qualitative data and mean and standard deviation for quantitative data) and Chi-square test by SPSS 20 software. Using frequency distribution and percentage in three categories including favorable (81-100), rather favorable (51-80) and unfavorable (0-50), test mining was used to survey relations between variables.

3. Results

142 copies of the questionnaires were distributed according to number of hospital information system's users in Shariati hospital and from these questionnaires 101 (71%) were returned.

Figure 1. Frequency of User View Point about Iso Metric Criteria in Shariati Hospital

Users from all departments participated in this study including: clinic, emergency, admission and medical documents, pathobiology, radiology, discharge, pharmacy, cash desk, surgery room, surgery department, gynecology division, neonatology division and labor. 101 samples were included 6 male (5.9%) and 95 female (94.1%) and the most individuals, 65 (64.3%), were under 35 years old. More than 69(68.3%) have less than 10
years of work experience. From statistical population of study, the most samples, 25 (24.7%), were related to surgery department and less one, 2 (1.9%), were related to pathobiology and pharmacy, in addition 53 (52.5%) were experts, 32 (31.7%) were associated and reminders were under advanced diploma. Concerning the comments' frequency table, there are 53(52.5%) rather favorable ideas about conformity with users expectations criteria, 27(26.7%) rather favorable idea about suitability for the task and unfavorable comments' frequency about system are including 27(26.7%) suitability for Individualization and 32(31.7%) suitability for learning. Concerning the importance level of these criteria from the view points of users, the suitability for the task criteria 84(83%) and level of error tolerant criteria 68(67.5%) were the most important ones (Figure 1).

4. Discussions
Concerning suitability of system for doing tasks and level of importance in hospital information system of Dr. Ali Shariati hospital, 27 people (26.7%) considered it as favorable system; in comparison with Alipour’ research about evaluation of hospital information system of children's hospital from the view points of users according to ISO 9241-10, 69 (72.7%) were agreed to this criteria and in Homburg and Hess research titled “Evaluation of Hospital Information System of German Hospitals” this criteria obtained 72% agreement (11). Arbiter, Mr.Saeedi, considers the most important purposes of information system as bellow (14):

- Improving the efficiency of personnel
- Omission the repetitive and unnecessary procedures
- Mining statics and information by faster and more accurate methods
- Making data relation by medical engineering systems

Regarding self description criteria of system, 46 people (45.5%) considered system as unfavorable. It means that Findings of this research aren’t collinear with the same researches andindicate the weakness of Dr. Ali Shariati hospital’ HIS (6). From the point of Controllability criteria of Dr. Ali Shariati hospital' HIS, 46 users (45.5) considered system as rather favorable and 54 (53.3%) as unfavorable. In comparison to research findings of Alipour et al. 46.9% of users were agreed with system. The most importance advantage of an appropriate information system is error deduction. Despite of lake of ability to control fault static data in system, according reports in form of valid and valuable statistical indexes such as bed occupancy rate and graphic charts, it can detect incorrect data easily and show the route of plotted problems (15). From the point of conformity with users expectations criteria Dr. Ali Shariati hospital’ HIS, the results indicate that HIS is compliance with user requirements.

Findings of a research by Ebadi Azar et al. shows the most factors for satisfying users are ease of reading, maintenance services and ease of work with program; Finance, human and technical investments are strongly emphasized to approach to organization and user requirements (16). From the point of error tolerant criteria rate of HIS, 41 users (40.6) considered the system as rather favorable. In case of any problem in first stage system allows omitting or other action and data can be returned after 10 min but only by administration of server (17).

5. Conclusion
In summary, Users with the less computer knowledge can enter information requirements and data records. Learning this system is so easy from the view points of users and managers. Regarding this matter that an appropriate system should include these criteria in high level to meet its implementation purposes, observation is a key factor in developing a favorable information system.

Acknowledgements:
The authors thank all of the participants who cooperated in this study. We especially thank Dr. Samiyeh Karimi and Raiziyeh Dehghan for Their support.

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