Nursing information system in hospitals of Zahedan city, Iran

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ABSTRACT

Purpose: Nurses can directly influence health services quality and outcomes. They need correct information in due time to provide an effective service for the patient and other healthcare personnel. Nursing information system is a subsystem of hospital information system that can help nurses to have better performances. The goal of this study was to evaluate nursing information system of hospitals of Zahedan city, Iran.

Materials and Methods: This descriptive, cross-sectional study was done in 2013. Nursing information systems of four teaching hospitals in Zahedan were evaluated. A verified checklist was used to gather the data.

Results: The studied nursing information systems had 42.19% of general data specifications and 72.33% of nursing data set. None of them had classification system standards. They had 45% of nursing data register priorities and 61.12% of report requirements.

Conclusion: Based on the pitfalls in general aspects, data register and classification, holding educational workshops, classes, and bulletins are recommended for hospital nurses of Zahedan city regarding nursing information system. Providing nurses with enough hardware requirements, supervising their system use, providing nursing information systems based on nursing classification standards and contribution of nurses in selection and implementation of this system is also suggested.

Keywords: nursing information system; hospital information system; nurse; Iran.

INTRODUCTION

Health industry has faced an increasing rate of information generation that is numerous and complicated in nature. Health information technology can help this high-demanded industry to manage its information. Health information systems are tools that integrate and communicate patient data and information and can process the data and make some new information.[1]

Nurses are one of the biggest service providers in healthcare industry that directly influence the health service quality and outcomes. Nurses need correct information in due time to have an effective service for the patient and other healthcare personnel.[2] Nursing information system is a computer program that helps nurses in gathering, storing, retrieving and displaying patient information for management of services and resources, increasing patient care quality and also nursing knowledge.[3] This system is an essential part of healthcare information system that can be used as a tool to create nursing records.[4] Furthermore, nursing information system can help in hospital information process, resulting in a better communication between healthcare team in the hospital.[5]

Michel-Verkerke stated that using nursing information

system in a hospital has a positive effect on information quality provided by nurses.[6] Ammenwerth and colleagues showed that nursing information system leads to better and more completed documentation of patient information and better quality of information process.[5] In this regard, participants of a study believed that computer-based nursing documentation system creates opportunities for better nursing documentation and legibility and improvement in communications with physicians.[7]

Zahedan city, located in southeast of Iran, uses hospital information systems in its teaching hospitals. Nursing information system is a sub-system of hospital information system used in these hospitals. The aim of this study was to evaluate nursing information systems of four hospitals in Zahedan city according standard indexes in four sections: general specification of systems, nursing data set, nursing nomenclature and classification specification, documentation registration and reporting specification of systems.

MATERIALS AND METHODS

This descriptive, cross sectional study was done in 2013. All teaching hospital affiliated to Zahedan University of Medical Sciences with an active nursing information system were included. Nursing information systems of these four hospitals were evaluated according a valid and reliable checklist that had been used in another similar study.

The checklist had five sections. Section 1 had some questions about the system, vendor, and some general information about nursing information system's module. Section 2 was about general specification of the nursing information system. It included 23 yes or no questions about patient care process, 11 about ward management process, 10 about communication process and one about research and education process. Section 3 had some questions about nursing data set, including five questions about nursing care data specification, 15 about patient data specification and 14 about service providing data specifications. Section 4 had 25 questions about nursing nomenclature and classification data specification with questions. Finally, in Section 5 nursing data, registration and reporting requirements were evaluated by six questions about personnel report, 14 questions about clinical report and three about financial report.

The researchers went to the chosen hospitals and gathered the required information by filling the checklists by means of interview and direct observation of the systems. Supervisor of each hospital, health information technologist and few professional nurses who used the nursing information system and were familiar with the competences of this system were interviewed. Furthermore, during interview the researchers were able to observe the nursing information system and its functions.

After gathering information, descriptive statistics was used to analyze the data by Microsoft Excel 2010 software. To provide confidentiality for hospital information systems, they were reported with alphabetic characters (A to D).

RESULTS

The general specifications of nursing information systems were evaluated in four hospitals by five aspects **(Table 1)**. Totally, the frequency of patient care process data specification was 44.56%, ward management data specification 31.81%, communication process data specification 47.5% and education and research data specification 50%. Nursing data set was evaluated in four aspects: nursing care data set, patient data set, service data set **(Table 2)**. Of course, nursing classification standards were not included in the results since none of the studied

Table 1. Percentage of nursing information system's general data specification in the studied hospitals.

Variables	A	B	C	D
Patient care process	17.39	21.73	86.95	52.17
Ward management process	18.18	9.09	36.36	63.63
Communication process	20	30	90	50
Education and research process	0	0	100	100

A and B refer to general hospitals, C and D refer to specialized hospitals. Data are presented as percentage.

Table 2. Percentage of nursing data set in the studied hospitals.

Variables	A	B	C	D
Nursing care data set	0	0	100	60
Patient data set	73.33	60	93.33	60
Provided services data set	85.71	78.57	78.57	92.85

A and B refer to general hospitals, C and D refer to specialized hospitals. Data are presented as percentage.

Table 3. Percentage of reporting data specification in the studied hospitals.

	A	B	C	D
Personnel report	83.33	100	0	33.33
Clinical report	35.71	64.28	64.28	85.71
Financial report	0	100	100	0

A and B refer to general hospitals, C and D refer to specialized hospitals. Data are presented as percentage.

systems had it.

According to our study, nursing care data set specification was 40%, patient data set specification 71.66% and service data set specification 84%. Data registration and reporting specification data was also evaluated in four aspects **(Table 3)**.

DISCUSSION

Nurses have an important role in healthcare systems. So documentation of their services would be very easy by a nursing information system. Implementing a powerful hospital information system as an infrastructure for any hospital ward subsystem is required for an effective nursing information system. According to our results, nurses can receive patient demographic data from admission, discharge, and transmission system of hospitals and also can register different requests such as laboratory tests, radiology and pharmacy services using nursing information system. In addition, they can observe laboratory and radiology results. But none of the studied nursing information systems supported evidence-based nursing and alert in variances from normal patterns. According to Ammenwerth and colleagues study, after using information systems, nurses report patient data documentation more quickly, have better information monitoring and progress in patient information legibility.[5] Kossman stated that electronic health record implementation in a hospital decreases inter-department communication and promotes critical thinking between nurses.[8]

Establishing electronic communication between different parts of a hospital is an important capability of hospital information systems. According our study, nurses can schedule the admission of patients in their wards using nursing information system in all parts of a hospital. They can access information in every part of the hospital. In two of the studied hospitals, i.e. hospitals C and D. Thus, nurses can transmit all information by nursing information system when changing their shifts. According Hinson and colleagues, using nursing information system would lead to having more time which can be spent on patient direct care (10.66%), decrease of

verbal communication (19.33%) and increase of mean time for reviewing data (8.9%).[9]

Standard nursing information system needs nursing concepts and nursing data standards.[2] Without a unified nursing language, internal data integration and external connection of information would disappear when information is shared and there would be a problem for clinical decision making. On other hand, nursing information is generally unstructured. So if there is no standard unified language, the retrieval of information would be difficult.[10]

Result of our study show that, none of the nursing information systems in the studied hospitals of Zahedan city use a standard nursing classification. Nursing classification system is an essential part of information systems that can considered as a tool to provide formalized nursing knowledge.[11]

All nursing information systems in our study registered patient demographic data, nursing diagnostic data and data about provided services by nurses. They could record electrocardiograph data too. In hospitals C and D, patient vital signs and input-output liquid balance data can enter the terminal near patient bed. Anderson and Hannah have stated that a standard nursing data set should involve nursing diagnostic data, nursing intervention, nursing outcome and intensity of nursing services. Using such standard data set, nursing services costs and resources allocation can be managed, nursing knowledge can be developed and nursing profession can be promoted.[12]

Making different reports is a basic management capability of a nursing information system. In hospitals A, B and D, the nursing information system had a schedule for personnel shifts. All the studied nursing information systems could make clinical reports such as laboratory and pathology reports and reports about admitted or discharged patients.

CONCLUSION

Nurses are the biggest group of nursing information system users. So their computer literature promotion has an important role in success and acceptance of nursing information system. Educational workshops and classes would be helpful for nurses in hospitals to help them use a nursing information system. Increasing inter-hospital communication between nurses and health information technologist can be helpful for transmitting professional knowledge between these groups. Using nurses' knowledge and skills in all phases of electronic system development and implementation and encouraging

electronic health systems developers to use this knowledge in their production is essential for having a successful nursing information system.

Since there is no national nursing standard classification and nomenclature system in Iran, providing such systems according national requirements is another important factor for using a nursing information system.

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CONFLICT OF INTEREST

None declared.

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