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The Perspective of Nurses on Nursing Information System: A Case Study in a Developing Country

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Abstract. The purpose of this study was to investigate the effect of nursing information system (NIS) on clinical performance from the perspective of nurses in an academic hospital affiliated to Mashhad University of Medical Sciences in Iran. This descriptive cross-sectional study was conducted in 2016. We collected data targeting nurses with over three years' experience in using the NIS (120 nurses). NIS had caused improvement in "accuracy the consistency of drug, lab tests and radiology requests", "increasing the speed of the automated extracting of minimum data set for decision making and care trends" with the means of 4.89 and 4.27 respectively (5 point Likert). Findings showed that "workload of nurses" (Mean 4.05), "duplication in recording patients' information" (Mean = 3.99) obtained the highest mean. Furthermore, "appropriateness of the data entry tools to tasks" (Mean=3.29) and "the ability of adapting the software to new responsibilities of nurses "(Mean=3.25) gained the lowest mean.

Keywords. Nursing Information System, Perspective, Information Systems, Nurses

Introduction

The objectives of the Nursing Information System (NIS) include scheduling a care plan, improving efficiency [1] and the effectiveness of provided care, improving the accuracy of nursing documentation, reducing the spent time for documentation, managing complicated data, and increasing the accountability of nurses on patients' care [2]. The nursing information systems reduce time and errors the documentation which as a result, increase nurse's efficiency [3-5]. While hospital information systems, including the nursing information system, have many benefits, if they are poorly designed or not accepted by users who use it, not only no benefits can be gained, but also it would have negative effects [6-7]. Previous studies have shown that poor design of Health Information Systems (HISs) can cause resistance and user' dissatisfaction, especially when the user believes that it is difficult to interact with its' interface [3].

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Other different factors such as increased workload should be paying more attention [5, 8]. Therefore, it is important to consider the views of users and their participation in the design of these systems [9]. The nurses are considered the largest and most important users of health information systems in health care centers; therefore, they play an important role in the acceptance and evaluation of these systems [10-12, 8, 3].

Some studies on the perception of nurses about the usefulness, ease of use and acceptance of these systems have been done [5, 13]. Therefore, performing the studies which evaluate the applicability and use of these systems as well as user's satisfaction would be effective for the acceptance and success of these systems. Accordingly, the purpose of this study was to investigate the effect of nursing information system on clinical performance from the perspective of nurses in an academic hospital affiliated to Mashhad University of Medical Sciences.

1. Methods

This descriptive cross-sectional study was conducted in an academic hospital affiliated with Mashhad University of Medical Sciences (north-eastern Iran) in 2016.The questionnaire was designed based on the published literature and included three parts: (a) demographic characteristics (gender, age, education level, working experience); (b) NIS effect on nursing processes (using a 5-point scale (5 = very better To 1 = very worse); (c) the appropriateness of the NIS for nursing tasks (using a five-point Likert scale (1 = strongly disagree to 5= strongly agree).

To ensure the validity, relevant studies were reviewed to ensure whether a comprehensive list of measures was included. The questionnaire was then validated by a panel of five experts (two nurse and one experienced researcher in health information management and two researcher in medical informatics). Furthermore, a pilot study was conducted to test the questionnaire. The nurses were, also, invited to make comments on the clarity and comprehensibility of the questionnaire. The test-retest reliability was 78 percent. We collected empirical data targeting nurses with over three years' experience in using the NIS. Totally of 150 questionnaires were sent out for all eligible nurses, 120 completed copies returned (response rate = 80%). Additionally information sheets describing the nature of the study, the anonymous nature of the questionnaire and confidentiality of data were given to all participants. The data was analyzed by SPSS version 16 using the ANOVA-test for numerical data, and chi-squared test for categorical data.

2. Results

Most of the respondents were females (64.2%) and the average age was 29± 5years. Most nurses (95.9%) had bachelor's degrees.

As table 1 shows, NIS had caused improvement in "accuracy the consistency of drugs, lab tests and radiology requests", "increasing the speed of the automated extracting of minimum data set for decision making and care trends" with the means of 4.89 and 4.27 respectively. On the other hand, the effect of NIS in some cases such as "reducing the time of documentation" "accountability to their duties" the accuracy, speed and precision of recording drug requests" and "accuracy, speed of display of nursing diagnoses and interventions" respectively gained the lowest score.

Table 1. The perspective of nurses towards NIS effect on nursing processes

Expected items of NIS	Mean ±SD (out of 5)
increasing in accuracy the consistency of drug, lab tests and radiology requests	4.89±4.82
Increasing the speed of the automated extracting of minimum data set for decision making and care trends	4.27±0.64
Improve the speed of access to patient care data	4.11±0.72
Increasing the accuracy of reporting the results an patient's or a set of patients requests in different dates	4.06±076
the speed of reporting the results of an individual patient's or a set of patients requests in different dates	3.99±0.85
Increasing the accuracy of the automated extracting of minimum data set for decision making and care trends	3.96±0.93
Increasing the transmission speed of messages among nurses or between nurses with other health care personnel	3.78±0.75
Assistance to improve efficacy and effectiveness of care	3.7±0.96
Improving accuracy the documentation of records	3.69± 0.86
Reducing the costs of ward	3.47±1.05
Speed in recording laboratory tests requests	3.45±1.08
Increasing accuracy in displaying tests results	3.3±1.13
The integrity of care programs, such as medical orders and nursing reports	3.22±1.15
Use the system to schedule more easily for controlling hospital infection	3.17±1.06
Accuracy in recording laboratory tests requests	3.1±1.14
Speed in displaying tests results	3.04±1.21
Reducing documentation time	2.96±1.03
Increasing the accuracy of displaying the nursing diagnosis and interventions	2.94±1.16
Accountability of nurses towards patient care	2.92±1.03
Increasing the speed of displaying the nursing diagnosis and interventions	2.7±1.22
Increasing the accuracy or precision of recording drug requests	2.64±1.28
Increasing the speed of recording drug requests	2.62±1.14

In Table 2, the appropriateness of the nursing information system to nursing processes has been assessed from the perspective of nurses. Findings showed that "workload of nurses" (Mean 4.05), "duplication in recording patients' information" (Mean = 3.99) obtained the highest mean. Furthermore, "appropriateness of the data entry tools to tasks" (Mean=3.29) and the ability of adapting the software to new responsibilities of nurses (Mean=3.25) gained the lowest scores. Nurses' demographic variables such as age (P=0.834), sex (P=0.795), and work experience (P=0.388) were not significantly relationship with factors of nursing processes.

Table 2. The perspective of nurses on the appropriateness of the NIS to the nursing processes

Important factors	Mean ±SD (out of 5)
I should follow a lot of steps to do my tasks	4.05±0.84
There is a duplication in recording patient information	3.99±0.81
The arrangement of the fields on the screen is understandable for what I do with the software	3.86±0.92
The software meets my job requirements perfectly	3.8±1
The main instructions for my work are easily available	3.78±0.9
I can set how to present the results according to my needs	3.77±0.94
I can find all the information that I need on the screen	3.73±1
The terms used in the software are appropriate to my work	3.66±1.08
The software imposes on me the tasks that are not part of my duties	3.42±0.86
The data entry tools is appropriate to the tasks I want to do	3.29±0.91
I can easily adapt the software with my new tasks	3.25±1.07

3. Discussion

In this study, Nursing information systems have improved nursing processes in some cases, such as the accuracy of reporting, the accuracy of coordination in drug requests, the speed and accuracy of data extraction. Nurses believed that using this system did not have a significant effect on reducing the time of documentation and being more responsible towards their functions, the accuracy, speed and accuracy of recording drug requests, the accuracy and speed of display of nursing diagnoses and interventions. The software also increased the nurses' workload, duplicated in recording patients' information, and increased steps of doing their job. Previous studies showed that NIS was helpful with more matching according to legal documentation requirements. The goal of the nursing information system is as follows: improving patient care support, completing nursing documentation, better assessment of the patient, readability of documentation, reducing the duplicate documentation, and improving the workflow [14]. Health information systems, would fail if it does not provide the users requirements and their needs.

Currell et al. showed that the effect of the nursing recording system on nursing activities has increased the time of documentation, but increased the standards of documentation [15]. Which is consistent with the findings of our study. Previous studies about the effects of nursing information systems showed that this system would improve the quality of nursing documentation [16, 17].

In our study, nurses' demographic variables such as age, sex, and work experience were not significantly relationship with factors of nursing processes. But previous studies showed that the age and high computer experience affects the attitude of nurses towards nursing information system [9, 18].

One of the primary goals of using nursing information systems is reducing the time of documentation and administrative affaires. Health care providers, which nurses include the largest and most important members of these groups, spend a lot of their time on these functions. The use of modern technologies and new data entry tools such as barcode readers can reduce this time to a certain extent and nurses have more time to provide patient care.

4. Conclusion

If nursing information systems are not designed appropriately for the nurses' routines processes, and do not provide some added values to them, and does not improve performance, they would look at the system as an intruder and sabotage that ultimately the system will fail. Therefore, evaluating nurses' perspective on these systems is important and their comments should be considered in improving and developing of the NIS. On the other hand, this study was conducted at only one academic hospital that restricting its generalization. Future researches should explore different hospitals.

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