

## Comparison of Manual and Electronic Methods of Nursing Record: A Nurse's Perspective

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### Abstract

Recording nursing reports is considered as a quality assurance tool for patients and nurses. Nowadays, the presence of electronic health record systems is an indicator of development. Studies on advantages and disadvantages of the electronic and manual recording methods have shown different results. In this study, electronic and manual recording of nursing reports were compared from the perspective of nurses.

### Methods and Materials

This descriptive-comparative study included all nurses in Neonatal Intensive Care Units (NICUs) of two health care centers equipped and non-equipped with electronic nursing records. A researcher-made questionnaire was used to evaluate and compare the viewpoints of nurses from four dimensions of accuracy and quality, time, health care information exchange, and control and management of nursing reports, after determining its validity and reliability. The data were analyzed with SPSS software version 16.

### Results

Comparison of the survey's subscales showed a significant relationship between the two subscales of time and control and management of nursing reports between the two centers ( $P < 0.05$ ). Nurses working in the center with manual system spent more time for writing nursing activities and there was a better control in the electronic system than the manual system.

### Conclusion

According to the results, despite many positive aspects, the electronic recording systems have still some defects which resolution is a responsibility of the designers of these systems. To this end, feedbacks of nurses as the users of these systems can be used to tailor them with nursing needs and activities, to improve their performance, and to increase care quality.

**Keywords:** Comparison, Electronic method, Manual method, Nursing record.

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## Introduction

One of the main responsibilities of nurses is the correct transfer, record, and report of data. Any errors or negligence may result in professional problems for nurses (1). Complete recording is the first condition of a good care. Writing all cares taken to patient is the result of care and response to treatment. Nothing as a complete, standard record can represent all works done for patients (2, 3). Therefore, nursing record is considered as a quality assurance tool for patients and nurses. Nursing record is of importance in improving the quantity and quality of nursing care and in defending the rights of patients and nurses (4). As health care becomes increasingly complex, the need for teamwork and effective communication about patient care is perceived more important than ever. Effective nursing care is always related to the quality of available information, and nurses are known as the primary collectors, producers, and users of the patient information (5). In other words, as the largest group of health care providers, nurses are strongly dependent on information for performing their activities in therapeutic-management areas (6). In addition, the care activities of nurses are infinitely varied, such as health care, education, recording physician's orders, ward management, recording and documentation of performed activities, and communication (7). In response to these needs, nursing information systems have been developed (6). In this regard and in response to the needs for clinical, administrative, and legal information, nursing managers have focused on developing electronic records (8).

In fact, the record represents the taken care and its quality. In addition, hospital electronic information system is an indicator of health development and seeks various goals including management, storage, retrieval, and analysis of information and facilitating research

affairs (9). Meanwhile, electronic recording of nursing reports is of particular importance, namely improvement of patient security and increment of record quality (10). In the majority of studies, reduced time of recording and increased duration of patient care were mentioned as the main primary outcomes of electronic record (11). This is while nurses spend almost 38% of their work shifts for writing nursing reports (1, 12) and in fact, electronic recording can reduce this time. Other advantages of computerized recording are reduced errors, higher quality, easier communication with patient, automatic documentation and recording, and easier access to information (8). Despite these advantages, expensiveness of equipment, launching, and support of the system, as well as the need for continuous additional education, endless changes in technology and lack of interest and motivation of personnel can impede the implementation of electronic information systems in hospitals (4, 8). According to the results of Cahooi and Mohammadi et al., electronic nursing record can accelerate the tasks, increase patient care time, and improve inter-department exchanges; however, it can raise nursing workload (5). In another study, almost half of nurses were against the positive impact of electronic record on evaluation of patient condition and making decision to take an action (13). In most health centers in Iran, computerized recording is performed for financial and administrative issues such as transfer and displacement of patients, visits of physicians, recording of requests and paraclinical results, while nursing record is performed traditionally, manually, and incomplete (8, 9). Therefore, there is no clear information about preference of electronic record to manual record and the studies show different results about the advantages and disadvantages of the two methods of electronic and manual records. In addition, no research exists comparing

the two recording methods from the viewpoints of nurses. Since improving the quality of recording nursing reports is critical and necessary (3) and it has a special effect on the quality of care and patient's security according to the results of most studies (10), recording in the intensive care units of neonates who are more vulnerable is more important. Therefore, in the present study, electronic and manual nursing records were compared from the viewpoints of nurses working in NICUs in two health care centers of Tabriz Medical Sciences University, Tabriz-Iran.

### Materials and Methods

This descriptive-comparative study included all nurses in NICUs of two health care centers; one equipped with electronic recording system for nursing reports, and the other not. The nurses enrolled in the study through the census method. Inclusion criteria were occupation in NICU: having nursing bachelor's degree, and a minimum of six months experience in NICU. The instrument used in this study was a two-partite questionnaire; the first part included demographic and occupational characteristics such as age, employment type, the ratio of patient to nurse, work experience, and employment history in ICU; the second part was a researcher-made questionnaire which reviewed the viewpoints of nurses about nursing records and included 19 items in four subscales of nursing reports accuracy and quality, time, control and management of nursing records, and health care information exchange. The items were answered based on the Likert scale (totally disagree, somewhat disagree, strongly agree, somewhat agree). Each answer was scored 1, 2, 3, or 4 according to the items load (positive or negative) or vice-versa for each response. Negative statements in the questionnaire were those items which eliminated and minimized the effects of nurses' attitudes towards agreement with

all statements. Informed consent was obtained from each participant and was approved the research by the appropriately Constituted Ethics Committees at Tabriz University of Medical Sciences. The content validity of the instrument was determined through surveying ten professors in the nursing faculty. The reliability of the tool was calculated as 0.75 with cronbach's alpha. The data were analyzed with SPSS-18 using descriptive statistics and inferential statistics (*t*-test, chi-square, and fisher's exact test).

### Results

Sixty-three nurses participated in the study, 52.4% (n=33) of whom worked in the center equipped with electronic recording system and 47.6% (n=30) in the center with manual system. In the equipped center, 74.2% of nurses were hired or contracted and 25.8% were employed as the human resources project. All nurses in the non-equipped center were hired or contracted. Mean age, work experience, and the ratio of patient to nurse are depicted in (Table.1). Comparison of the survey's subscales using independent *t*-test showed a significant relationship between the two subscales of time and control and management of nursing reports between the two centers ( $P < 0.05$ ). In the time subscale, the difference was in recording nursing reports and vital signs; so that the nurses in the manual system center spent more time to record nursing report. However, those in the center with electronic recording system spent more time to record vital signs. Also from the perspective of nurses, control and management was better in electronic recording system than the manual system (Table.2). According to the results, no significant relationship existed between the viewpoints of the nurses and their demographic characteristics including age, employment type, the ratio of patient to nurse, work shift, work experience, and ICU work experience ( $P > 0.05$ ).

**Table 1:** Mean and standard deviation of age and occupational characteristics of the nurses

Health Center	Electronic System				Manual System			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Variables								
Age (years)	32.23	7.04	23	52	33.18	4.33	27	41
Work experience (years)	8.37	6.30	0.5	22	8.59	3.54	4	16
NICU work experience (years)	5.62	4.64	0.5	14	4.24	3.17	0.5	12
Ratio of patient to nurse	7.21	1.42	4	10	3.65	0.35	3	5

**Table 2:** Comparison of the mean and sd of subscales of the questionnaire in the two centers

Health Center	Subscale	Score range	Electronic System				Manual System				t-test	
			Min	Max	Mean	SD	Min	Max	Mean	SD	P-value	F
	Accuracy and quality of nursing reports	4-24	9	20	14.78	2.75	10	21	0.37	3.14	0.43	1.2
	Time	4-16	5	11	7.9	1.88	6	14	9.1	1.51	0.008	4.1
	Health care information exchange	4-20	9	18	14.86	2.31	11	18	13.96	1.95	0.11	0.8
	Control and management of nursing reports	4-16	8	16	12.41	2.64	10	16	13.55	1.61	0.04	12.8

**Table 3:** Comparison of the questionnaire's items in the two centers

Items	Electronic system		Manual system		P-value
	Disagreed number (%)	Agreed number (%)	Disagreed number (%)	Agreed number (%)	
1. Nursing reports are accurately recorded by nurses.	31 (93.9)	2 (6.1)	30 (100)	0 (0)	* 0.49
2. There is enough time to take care of each baby.	9 (27.3)	24 (72.7)	10 (33.3)	20 (66.7)	0.60
3. There is enough time to write report for each baby.	12 (36.4)	21 (63.6)	10 (33.3)	20 (66.7)	0.80
4. Information exchange is rapidly done between NICU and other wards by the department nurse.	22 (66.7)	11 (33.3)	14 (46.7)	16 (53.3)	0.08
5. Head nurse has access to his/her staff nursing reports and controls them.	32 (97)	1 (3)	30 (100)	0 (0)	0.56
6. Standby supervisor can control nursing records at any time.	24 (77.4)	7 (22.6)	25 (83.3)	5 (16.7)	0.56
7. A long time is spent to record vital signs.	12 (37.5)	20 (63.5)	20 (66.7)	10 (33.3)	0.02
8. Nurses communicate well using this method of recording.	26 (78.8)	7 (21.2)	24 (80)	6 (20)	0.90
9. Nurses are informed of measures taken for the patient.	29 (87.9)	429 (12.1)	28 (93.3)	2 (6.7)	* 0.38
10. A long time is spent to write the nursing reports.	6 (18.8)	26 (81.3)	0 (0)	30 (100)	* 0.02
11. Information can be recorded during taking care.	12 (36.4)	21 (63.6)	11 (36.7)	19 (63.3)	0.98
12. No duplication is required for recording patient's information.	11 (34.4)	21 (65.6)	12 (41.4)	17 (58.6)	0.57
13. Monitoring the baby's condition using previously recorded information by the nurse is difficult.	22 (71)	9 (29)	17 (63)	10 (37)	0.51
14. No errors occur when recording the reports and information of baby in the ward.	8 (24.2)	25 (75.8)	11 (36.7)	19 (63.3)	0.28
15. Access to the whole nursing reports of baby from admission is difficult.	27 (84.4)	5 (15.6)	14 (46.7)	16 (53.3)	0.002
16. There are specific forms for recording the nursing reports in the ward.	19 (57.6)	14 (42.4)	17 (56.7)	17 (43.3)	0.94
17. Baby's nurse can easily control his/her recorded information.	25 (75.8)	8 (24.2)	26 (86.7)	4 (13.3)	0.27
18. Information of admission and discharge is available for nurses at all work shifts.	18 (54.4)	15 (45.5)	25 (86.2)	4 (13.8)	0.007
19. Many repetitive and stereotyped entries are recorded in nursing reports.	11 (33.3)	22 (66.7)	7 (23.3)	23 (76.7)	0.38

\* The result of exact Fisher's test

## Discussion

In this study, the viewpoints of nurses about nursing reports were compared in two centers, equipped and non-equipped with electronic recording system. The results showed that no significant relationship existed between demographic and occupational characteristics of the nurses (age, work experience, and employment in NICU) and subscales, as well as the questionnaire's items. Cahooi *et al.* (2013) studied the attitude of nurses towards the impact of electronic reports on patient care and found that younger nurses with less experience had negative attitude towards the impact of computerized nursing program (13). However, in a study by Lee *et al.* (2008), younger nurses were more satisfied with nursing electronic system (14).

Comparison of the viewpoints of nurses about the subscales of the questionnaire showed that the nurses in the center with manual system spent more time for nursing writing activities. Cahooi *et al.* (2013) and Cahooi and Babamohammadi (2013) showed that more than fifty percent of nurses believed that computer program can accelerate patient care (5, 13); these findings are somewhat consistent with the results of the present study.

However, according to the viewpoints of nurses in the center with electronic system, more time was spent for recording baby's vital signs. This is probably due to repeated recording of signs at different locations of the system. Cahooi and Babamohammadi have also reported repetitive recording of nursing information in the electronic system. In a qualitative study, Stevenson and Nelson (2012) have assessed nurses' perceptions of electronic records and found that nurses had to record similar information, in particular vital signs, at different sites of the system.

There is also a better control in the

electronic system than the manual system from the perspective of nurses. Also, control of the reports by the head nurse, the standby supervisor, and even the nurse is easier in this system. In the study of Cahooi and Babamohammadi, 58% of nurses believed that electronic systems meet the occupational needs of nurses, matron, and other managers (5).

According to the results, no significant difference was found between the centers in terms of "health care information exchange," however, the mean score in the center with electronic system was better than the center with manual system. In a study by Toulabi *et al.* (2012), optimization of hospital electronic information system improved the nurse-patient relationship and the treatment team (8). According to the study of Cahooi and Babamohammadi, 72.5% of nurses believed that inter-department information exchange can perform faster with electronic system (5).

There was no significant difference among the viewpoints of nurses in both centers in terms of "accuracy and quality of nursing reports." In other words, nursing reports had a proper accuracy and quality in the manual system. In the study by Toulabi *et al.* (2012), the quality of electronic nursing records in CCU was very high in some cases (2). However, no similar study was found to compare the quality of reports among two systems.

Based on the results, "access to information of admission and discharge at any time" and "access to whole nursing reports of baby from admission" were difficult for nurses in the center with manual system. However, more than half of the nurses in the center with electronic system believed that access to the information was easy. This is while only 38% of the nurses in the study of Cahooi *et al.* believed that computer program can give all information about patient care (13). This difference may be due to

differences in computer systems in the various centers.

Apart from the items discussed, no much difference was observed between the two centers in other items of the questionnaire. This suggests that despite technological advances, electronic systems have failed to find their right place in health centers. The main reason may be the inconsistency of the systems. Vitanen *et al.* (2011) showed that the electronic nursing record system has many practical problems and nurses have reported many negative experience of this system (15). In addition, nurses believe that electronic recording system does not support nursing activities (10). A study in Iran showed that a majority of nurses believe that electronic system programs are not compatible with nursing tasks (5) Therefore, development of computer systems should be performed according to the knowledge of the staff from system function and their opinions (16). Attention to the viewpoints of nurses during designing electronic recording systems can ensure the compatibility of the system with nursing activities, improve the task, and increase the quality of care (10).

### Conclusion

In Iran, the nursing records and data are not integrated and not follow a particular information system (9). Given that the main objective of these systems is to improve communication, increase service quality, and satisfaction of staff and patient (6) and since nursing information systems have a positive impact on meeting the challenges of care organizations (5), improvement of hospital information systems seems necessary. Therefore, it is recommended to carry out extensive surveys to determine the needs and compatibility of the information systems with conditions and facilities of hospitals and to perform other applied research in this area.

A limitation of this study was the use of a researcher-made questionnaire, however, it was tried to compensate this problem through its high validity and reliability. In addition, the present study was limited to NICU due to almost identical circumstances considered for the two comparison groups. Therefore, similar comparison studies in other departments may be recommended.

**Conflict of interest:** None

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