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# Quality of nursing documentations in CCU by Hospital Information System (HIS)

**Tahere Toolabi [1], Zohre Vanaki [*1], Robabe Memarian [1], Mehrdad Namdari [2].**
*1. Tarbiat Modarres University, Faculty of Medical Sciences, Nursing Department, Tehran,Iran
2. University of Medical Sciences, Khorramabaad, Lorestan, Iran.

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**ABSTRACT**

**Aims:** Nursing documentations describes quality of nursing care delivery. One of the development indicators of health care is the existence of hospital information systems (HISs). The aim of this study was evaluation of the quality of nursing records through an electronic information system in the CCU in one of the educational hospitals in Lorestan.

**Methods:** This study is a participatory action research. It was done in order to enhance quality of nursing documentations through four phases. This study was done on 630 recorded nursing documentations in 70 files existed in electronic information system of the hospital by using census method in 2011. The data gathering tools was the observational checklist of recorded nursing cares included 127 items in functions of vital systems, general cares and patient education. Data analysis was done by descriptive statistics.

**Results:** Change in vital signs, chest pain, disrhythmias, patient's appetite, amount of infusion and transfusion and changes position of more than 70%, dedicated maximum frequency of the complete record. But the possible complications, nursing interventions, patients' responses to these interventions after infusion and transfusion and teaching drug diets hadn't been recorded in any of the nursing documentations completely. Respiratory disorders (34.3%), anxiety and restlessness (35.7%) had the lowest frequency of complete recording, in spite of their high importance in CCU.

**Conclusion:** Using the HIS, in some cases, the quality of nursing documentations is in high level, but according to the existing facilities, the enhancement is possible. Furthermore, it is recommended to prepare ready nursing documentations forms, place the network on the electronic portable devices or on the patient's bedside, remote access of health team and accomplish applied researches.

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* Correspondence Author: Zohre Vanaki
Tarbiat Modarres University, Faculty of Medical Sciences, Nursing Department, Tehran, Iran. Tel:+98-2182883814
Email: vanaki_z@modares.ac.ir

## 1. Introduction

The first and the most important factor in improvement of the care quality is the record of nursing care [1]. Due to the emphasize on the

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source management, cost control, effectiveness of the patient's care, improvement of the quality of the nursing documentations and nurses' responsibility, secure care giving to the patients is in high importance and needs to be appropriately recorded [2]. Weak record imperils the patient and nurse's security [3]. Since recording all cares done for a patient is the consequences of care and therapeutic response, there is nothing to show all the services given to a patient but a standard and complete documentation [4]. From the other hand, not recording care means not doing it [5]. Investigation, documentation and timely report in the intensive care unit lead to timely designing and decision making of the medical team and decline the accession of cardiac emergencies [6]. But in spite of the importance of the quality of nursing documentations in CCU, the results of various indoor [7] and outdoor [8] studies show the weakness of the quality of nursing documentations. So that Hanifi and Mohammadi (2004) have reported the quality of nursing documentations in CCU as 17.09% in a desirable level, 35.81 % incomplete and 48% not recorded and in nurses' point of view, the most important cause for the weakness of correct nursing documentations has been mentioned not controlling and observing and not noticing recording procedure and nonexistence of an appropriate documentation system in the hospital [9] Present health care systems lead the nursing managers' notice to mark the development of computer files in response to clinical management and legal information need [10]. According to the present massive data, it is almost impossible to meet the needs without using information systems [11]. In this case, the development of nursing information systems has been accelerated [12]. One of the therapeutic development indicators is the existence of hospital electronic information systems which follows different objectives such as supply management, retrieving, data analysis and research convenience affairs [13]. HISs for the first time was used in 1960. The early systems were very simple but gradually by increase in data mass, clinical and laboratory data were added to them that leaded to an increase in system's efficiency and considerable decrease in the costs. In the next stages also decision making and clinical support were added to these systems. Patients' information dispersal and lack of access to their precedents and weakness of cooperation among therapeutic-care team, lack of awareness and easy access to the standards (such as nursing cares standard and consequently not using them similarly in different shifts by nurses) are some of the problems of health team. Nurses as one of the most active and effective members of this team can play their professional roles by developing information technology and cooperation of other systems and can help to promote the society's health level and solving the mentioned problems. The universal health organization has mentioned the universal viewpoint policy for electronic health as the research schema with the priority of above and yet has published the revision and survey reports on the representation of electronic health place [14]. One of the criteria of the evaluation of every country's health system from WHO's point of view is the use of information technology in health area.

This technology comprises various phases of health and therapy (care quality, cost output, ease of access and care economy) [15]. The early study done by this research group showed that though HIS charged as the electronic health substructure, nurses as one of the ultimate users account this system appropriate for the financial division but mentioned its using in nursing care very limited and only in partial record, instead of the last notebooks.

Inadequacy of information technology projects in health care is also prevalent [16]. More profound reasons for these inadequacies are the subjects of the research [17, 18]. But some of the main factors have been recognized, such as inappropriate perception of users' need which is



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the most attractive [16]. From the other hand, the universal viewpoint is that better care giving is possible by activating technology [14] and recently more pressure on clinical specialists and health care organizations to use electronic health files is one of the messages and strategies of developed countries [19, 20]. Iran is one of the countries which launched to use technology and has presented suggestions on video conference, diagnostic, therapeutic, remote surgery and remote caring methods [14]. One of the compasses of national guidelines in developing information technology in the country is health and nursing care is the key element of health.

Also nurses use these systems to advance the clinical and management goals [10]. These systems help the nurses in organizing the information, improving things, and data management [21, 22].

Various studies present different approaches to enhance the quality of care documentations which were partially practical on continuing education for nurses [4] colleague evaluation [23] and performing leading programs [24] and… . But the organizations played no role in its use and performance. Now the problem is that according to the present facilities and situations and improvement of science and technology how can improve the quality of nursing care and documenting and create a permanent change in care system of intensive care unit.

To achieve this, nurses, managers and other members' cooperation in recognition of the problem, design, performance and evaluation of the ways to improve the quality of caring is essential. In this case cooperative action research is the best choice to achieve the goal that this study has chosen it.

Action research is one of the qualitative research methods. In this approach the researcher follows the action and the study results simultaneously. The pattern of this study was cooperation and partnership and is based on the social theory of change [25-27]. Action research developed following Kert Luin [28]. This study is used as a methodology that involves health specialists in designing the pattern of care improvement. Cooperative–action research is a process in which the researchers and the participants systematically cooperate in "seek ,thought ,action" [29] and the researches cooperate as observers and change, data gathering and analysis operators and reporting the results to the specialists and performing of changes with participants and evaluation of changes effects [26,30]. Nowadays most of the nurses studying in Australia and England use action research [33]. Cooperative–action research's aim is to improve the action and change in the social structure and activities which present irrationally, unfairly and dissatisfactory [32]. Undoubtedly action research is the most popular and challenging term in organizational research area. Today this term is considered as an "umbrella" that covers a set of activities aiming at variation [33].

Literature review shows that despite the importance of the quality of nursing reports in intensive care units legally, communicative, caring, educational, research and information systems' entries to the hospitals as tools to improve the quality and legal need to use it in the country's hospitals, no study has been reported yet. Nurses as the effective and active members of health care team doubt on its usage. However limited studies have been done in different countries to improve this system in order to enhance therapeutical health care, the results show the existence of problems in the way of using this technology in cares. Despite the effectiveness in developing care quality, decreasing the costs and control and observation improvement, the organizations are challenging in developing the use of patient care information systems. Furthermore for optimum use of this technology, members' cooperation and changes in present status and social-cultural preparation seem essential.



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Therefore in order to achieve the most desirable output as though the services are effective and efficient it is needed to consider effective factors on therapeutical health care system and emphasize on objectives like enhancing ease of access to cares, improving intensive cares, measuring the effects of nursing cares with patients' responses and generally on improving the quality of nursing more than before. Thus the researchers tempted to do a cooperative action research with all the members participating in four phases of defining the problem or investigating the existing status, planning, performing and evaluating the change programs. Therefore in order to investigate the present status (first phase) on the quality of records. The present study was done aiming at determining the quality of nursing documentations using the HISs in one of the educational hospitals of Khorramabad.

## 2. Methodology

This study is part of a cooperative- action research (phase1). Action research was done in order to improve the quality by changing in four phases. The first phase included determining and confirming the problem or investigating the present status. The second phase included planning change programs. The third was performance and the fourth phase was evaluation of change programs. Data gathering tools were interviews, intensive group discussions, checklists of nursing care records and observing nursing cares to the patients and the questionnaire on patient's satisfaction. But in this study, only the results of the first phase will be presented which are on observing the quality of nursing documentation in electronic information systems. This study was done on

Table1: Absolute and relative frequency distribution of cardiac patients' files who are hospitalized in the intensive unit from the quality of recording nursing documentation point of view by hospital information technology system of one of the educational hospitals of Khoramabad in 2011 about general status of the patient.

| | Items | Complete records (percentage) | Incomplete record (percentage) | Not recorded (percentage) | No cases (percentage) |
|---|---|---|---|---|---|
| 1 | patient's general status vital systems' function | - | - | - | - |
| | Vital signs change (P, R, BP...) | 61 (87.1) | 9 (12 .9) | 0 | 0 |
| | Pain in chest or other parts | 65 (92.9) | 3 (4.3) | 2(2.9) | 0 |
| | any intake disorders | 24 (34.3) | 6 (8.6) | 40 (57.1) | 0 |
| | Disrhythmias | 54 (77.1) | 0 | 16(22.9) | 0 |
| | Change in paraclinical tests | 47 (67.1) | 2 (2.9) | 21 (30) | 0 |
| | Anxiety | 25 (35.7) | 7(10) | 38 (54.3) | 0 |
| 2 | vital signs status | - | - | - | - |
| | Accomplished actions | 26 (37.1) | 9 (12.9) | 35 (50) | 0 |
| | Patient's response to the actions | 4(5.7) | 21 (30) | 45 (3.64) | 0 |
| 3 | Intake and output status | - | - | - | - |
| | Patient's appetite | 66(94.3) | 0 | 1(1.4) | 3(4.3) |
| | Diet disorders | 19(27.1) | 3(4.3) | 17(24.3) | 31(44.3) |
| | Accomplished action | 3(4.3) | 1(1.4) | 30(9.42) | 36(51.4) |
| | Patients' response to the actions | 1(1.4) | 0 | 33(47.1) | 36(51.4) |
| | The record of infusion and transfusion amount | 68(97.1) | 0 | 2(2.9) | 0 |
| | Possible effects record | 0 | 10(14.3) | 60(85.7) | 0 |
| | Accomplished actions | 0 | 6(8.6) | 41(58.6) | 23(32.9) |
| | Patients' response to the actions | 0 | 0 | 46(65.7) | 24(34.3) |
| 4 | Sleep and movement status | - | - | - | - |
| | Nightly sleep amount | 17(24.3) | 52(74.3) | 0 | 1(1.4) |
| | Movement status (complete rest, relative, or free) | 69(98.6) | 1(1.4) | 0 | 0 |



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630 nursing documentations in the files of all the patients in CCU with census method in 2011 (70 files).

At least 9 reports were recorded for each patient using electronic information system of the hospital. The checklist of observing nursing care records included 127 items on the vital systems function, vital signs status, intake and output, chest pain, sleeping and activity, paraclinic ,intensive changes in patient's status, medicine measures ,PR drugs, immune actions, orders by phone, pursuable cases, incidents record, accomplished nursing cares and patient's training which were surveyed according to the standards (recorded, incomplete recorded, not recorded, no case). In the case that more than 80% of the cases in the reports were recorded, it was considered "complete record" and less than that "incomplete record". The option "no case" or "not recorded" were recognized by assessment of patient's health status and studying the file.

After confirming justifiability and perpetuity of checklists, an early study was done to ensure the completion of the tools. Analyzing data was done by descriptive statistics. Since the aim of action research is to improve the standards and the existing situations with making changes, advanced and analytic statistical tests are useless. It is essential to mention that this schema was supported by Tarbiat Moddares University.

## 3. Rsultes

Study results showed that Change in vital signs, chest pain, disrhythmias, patient's appetite, amount of infusion and transfusion and movement status in more than 70% were recorded completely. Date, time and the amount of vital signs were recorded in 100% of the reports. Furthermore the accomplished actions and patient's response to these actions

Table2: Absolute and relative frequency distribution of cardiac patients' files who are hospitalized in the intensive unit from the quality of recording nursing report point of view via hospital information technology system of one of the educational hospitals of Khoramabad in 2011about laboratory and Para clinic tests, pursuable cases and intense cases in patient's status.

| | Items | Complete record (percentage) | Incomplete record (percentage) | Not recorded (percentage) | No case |
|---|---|---|---|---|---|
| 1 | Laboratory and Para clinical tests | - | - | - | - |
| | In necessary cases, informing the doctors in blood test and the Accomplished actions | 6 (8.6) | 0 | 64(91.4) | 0 |
| | Patient's response to the actions | 0 | 4(5.7) | 66(94.3) | 0 |
| | Xerography type | 50(71.4) | 1(1.4) | 19(27.1) | 0 |
| | Informing doctor in case of necessity | 0 | 2(2.9) | 68(97.1) | 0 |
| | Informing doctor in case of necessity on ECG | 25(35.7) | 0 | 45(64.3) | 0 |
| | Accomplished actions | 24(34.3) | 5(7.1) | 41(58.6) | 0 |
| | Accomplished actions and patient's response to the actions in the case of existing of arrhythmia in the monitoring | 0 | 0 | 70(100) | 0 |
| 2 | Pursuable cases | - | - | - | - |
| | Preparation in angiography, pace… | 10(14.3) | 0 | 1(1.4) | 59(84.3) |
| | Councils | 9(12.9) | 1(1.4) | 0 | 60(85.7) |
| 3 | Intense changes in patient's status | - | - | - | - |
| | Main complaints | 47(67.1) | 1(1.4) | 1(1.4) | 21(30) |
| | Problem process | 3(4.3) | 38(54.3) | 8(11.4) | 21(30) |
| | Performed orders | 46(65.7) | 2(2.9) | 1(1.4) | 21(30) |
| | Patient's response to the actions | 6(8.6) | 13(18.6) | 30(42.9) | 21(30) |



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respectively were reported completely in 37.1% and 5.7%. But possible effects, the kind of used accomplished actions, patient's response to these actions, after infusion and transfusion and drug diet training were not completely recorded in the reports. Respiratory disorders (34.3%), anxiety and restlessness (35.7%) despite their importance in intensive unit had the lowest frequency in the complete record (table 1).

Radiography type and time, patients complain in critical times, accomplished orders had the maximum frequency in more than 65% (table2). Blood test type, enzyme, urine and excretion and the time of performing electrocardiography also were completely recorded in all of the reports. Monitoring and the type of heart rhythm, performing and receiving test time had the most frequency in more than 85% of the cases. Whereas informing doctors on blood test result, radiography electrocardiography, accomplished actions and patient's response to the actions especially in critical times and by monitoring had the least frequency (table2).

Type and status of movement restrict, training the amount and way of activity, time and amount of PRN drugs were recorded completely in more than 60% (table3). But nurses' cares the name of drug and serum, method, amount and time of its use had complete records. But the patients' response to the treatment, possible effects of the drugs, accomplished actions, patient's response and patient's training on food diet; drug and disease

Table3: Absolute and relative frequency distribution of cardiac patients' files who are hospitalized in the intensive unit from the quality of recording nursing report point of view via hospital information technology system of one of the educational hospitals of Khoramabad in 2011 about drug measures, immune, doctor's prescriptions through phone, nursing measures, patient and attendants'' training

| | Items | Complete record (percentage) | Incomplete record (percentage) | Not recorded (percentage) | No case (percentage) |
|---|---|---|---|---|---|
| 1 | Drug measures | - | - | - | - |
| | Patient's response to drug | 3(4.3) | 23(32.9) | 44(9.62) | 0 |
| | Possible effects of drug | 2(2.9) | 1(1.4) | 65(92.9) | 2(2.9) |
| | Accomplished actions and patient's response to the actions | 1(1.4) | 0 | 64(91.4) | 5(7.1) |
| | The time and amount of PRN drug | 39(55.7) | 0 | 1(1.4) | 30(42.9) |
| | Condition of using PRN drug | 27(38.6) | 1(1.4) | 12(17.1) | 30(42.9) |
| | Patient's response to the drug | 22(31.4) | 1(1.4) | 18(25.7) | 30(42.9) |
| 2 | Immune actions done for patients | - | - | - | - |
| | Cramp type | 67(95.7) | 2(2.9) | 0 | 1(1.4) |
| | Cramp's situation (being p or down situation of the hand-ail next to the bed) | 67(95.7) | 1(1.4) | 2(2.9) | 0 |
| 3 | Doctor's prescriptions through phone | - | - | - | - |
| | Calling time record | 18(25.7) | 0 | 0 | 52(74.3) |
| | Call content | 17(24.3) | 1(1.4) | 0 | 52(74.3) |
| | Information Receiver | 17(24.3) | 1(1.4) | 0 | 52(74.3) |
| 4 | Accomplished nursing actions | - | - | -- | - |
| | Measure type | 70(100) | 0 | 0 | 0 |
| | time of accomplishing the Measure | 64(91.4) | 5(7.1) | 1(1.4) | 0 |
| | Performer | 69(98.6) | 0 | 1(1.4) | 0 |
| 5 | Patient and attendants' training | - | - | - | - |
| | Activity type and amount training | 57(81.4) | 11(15.7) | 1(1.4) | 1(1.4) |
| | Diet training | 7(10) | 0 | 63(90) | 0 |
| | Drug diet training | 0 | 1(1.4) | 69(98.6) | 0 |
| | training on Disease nature | 2(2.9) | 0 | 68(97.1) | 0 |



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nature had the least frequency of complete record (table3). Gavage, lavage, puke, vomiting, incontinence of urine and excretion and preventing actions of pressure sore had no case in most of the patients ,in other words they were not as patients care needs.

Other important findings of this research were recording the report in information system by someone other than the care giver and not recording some of the accomplished cares such as patient's training, informing the doctor in the case of necessity on laboratory and paraclinical results, performing emergency actions before doctor's arrival, especially before, during and after CPR. Also nursing recognition, interference and expected consequences were not recorded on the basis of standard and scientific patterns.

## 4. Discussion

Using HIS, nursing documentation in patient's files confined in CCU on change in vital signs, chest pain, disrhythmias, having defecation, amount of infusion and transfusion and movement status, blood compliance, test type, electrocardiograph type, monitoring, tests pursuing, medicine and serum, type and status of movement restriction… have high percentage. It seems that the abilities of these HISs such as time record, registrar's name; vital signs chart, copying, and saving data… were effective in this case. But according to the findings and present facilities, it is essential to develop the system due to patients' need.

Furthermore this study's findings are due to the use of report form which is prepared by hospital's information technology unit and participation of unit's supervisor. Compared to the past and due to typing problems and lack of nurses, it could help nurses in recording the reports. But patients' needs are different and using a permanent pattern leads to repetitive actions records without considering patents' condition, recording some of incomplete actions and not recording most of complete actions. In fact the results showed that the nurses didn't present professional behaviors in nursing care and in other words, cares were not "patient-oriented", rather it has been recorded according to nursing unprofessional form in the HIS on doctor's prescription or according to cardex. In literature review, no similar study was found which especially surveyed the quality of nursing documentation through this system and was mostly about using HIS and nursing documentation was part of it.

The results of a qualitative research using deep interviews, documentary studies and observations in an educational hospital of Pakistan in Eslamabad showed the successful use of HIS and reported more efficiency compared to what is used [34]. These results are correspondent to the results of this study. Also the results of Habibi Kulaii et al indicated that generally nursing information systems in Iran meet 35.7% of the needs and needs for personnel, clinical and financial reports were respectively 20.4, 63.5, 85.2% [35] .Other effective factors in the successful performance of HIS are considering change management, need for effective relation canals and having important outlook to variation [36]. Wide and appropriate planning, supporting policies and performing them in high levels are defined as important success factors. By studying references, it is realized that social factors are more important than technical factors in successful performance of this technology [34, 35]. Hertzum and Simonsen studies showed effective results of patient's electronic files in three clinical activities including team conferences during work, unit osmosis and nursing writings in mental incidents [38].

The results of Adam's research showed that cooperation and balance in network users create new opportunity for considering patients and other health care takers by ease of making information, cooperation and data retrieval [39]. Also in a study, cooperative planning was used for coordination and relation between health team members by phone for clinical activities in various cases [40]. Karahoca et all's



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study showed the successful use of cell phone in emergency unit and reported increasing of satisfaction [41]. However it is important to consider cultures, feedback, software challenges, work process and real record in using information technology [42]. In recent decades, the number of user-oriented approaches for developing health information system including cooperative planning [43] to engineering has been increased [44, 45]. Bardram stated that using HIS and due to patient's condition, a nurse can codify nursing care schedule for next 24 hours [46]. But the results of present study showed that nursing diagnoses, intervention and expected consequences haven't been recorded in most of the reports which is in accordance to the results of the study on nursing information systems in Iran which explains that these systems do not support nursing process [35]. Furthermore accomplished actions and patient's response to these actions during appearing disorders in vital signs and possible effects are in low level. Also accomplished actions and patient's response to these actions after infusion and transfusion haven't been recorded completely in any of the documentations. Although it is one of the important duties of nurses to pursue patient's recovery procedure and patient's response to therapeutical and care actions, the results showed that they were not considered in recording and that mostly they tried to record routine activities and doing doctor's order. This inattention of nurses was due to the use of a traditional method for writing nursing documentations and it was only according to cardex and without assessment and recognition and appropriate relationship with patient

In a research done in Germany, the amount of nursing use of HIS was 51% for account, 48% for order system ,45% for patient managing in unit, 23% for diet programs ,20% for management of nursing students ,14% for entering data related to time in respect to account, 7% care documentation and 6% care plan [47]. Generally the use of this system in nursing care planning is less, compared to financial and management divisions which is probably due to the fact that the early scheme of these systems have been financial and later nursing reports were added. But it is obvious that this system has the potential ability to improve nursing performance, to increase knowledge and to gather necessary data and information for cooperating in care policies. Minda and Bundage also reported that required time for digital documentation remarkably is less than handmade documentation and the number of recorded observations by computer is more than handy record [22]. But lack of adequate skill in typing, recording irrelevant activities by nursing, simultaneous handy record of nursing documentation in several books such as shift clinical report, cardiac-pulmonary revival, patients statistics…, cause nurse's dawdle and cause his/her to recede from patient. Therefore it is recommended to prepare ready nursing documentations or caring algorithms in the system and to present necessary trainings on the way they are used to the nurses. In Anderson and Hannah study, posing the set of nursing data was proposed including pricing nursing services, supporting source designation for nurses, defining nurses' communion and cooperation in patient caring, defining the results of nursing care, developing nursing education and stability of nursing improvement as a profession [48]. Due to the fact that in Iran's HIS clinical aspects of nursing are not considered, planning and emphasizing on the use of mentioned set help to improve the system and meeting nursing needs. However after a decade of using this system it is the time to present new generation of HIS with patient–oriented view and considering users' needs like nurse's remote access to the patient's information and controlling patient's condition out of the unit and hospital's environment, activating cardex part, planning HIS should be along with active cooperation of nurses, doctors and all the groups working in this process. It seems achieving this needs to do



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researches with cultural, social, cooperative and systemic approaches.

Other important findings of the present research was documentation via information system by a person other than the care giver and not recording some of the complete cares which resulted from not having simultaneous access of nurses during the shift (one computer for recording documentations and sending various requests of twelve unwell patients by three nurses), time consuming of entering and exiting to the system and work division (one person is in charge of recording the documentations) derive from lack of human forces which is not in accordance with documenting principles and it is known wrong in the point of professional rules .In the case of problem for patient, the recorder of cares as the performer will be interpellator and known as a convict. Therefore it is recommended, likewise providing adequate human forces to perform the work, it can be possible for the nurses to record the documentation by putting the network on phones or to increase the number of computers and or to place portable instruments on patient's bedside.

## 5. Conclusion

Nowadays electronic information system provides the possibility to record vital signs, medicine requests, tests, radiography, results of the tests and radiography and traditional record of nursing documentation for nurses in hospital and during patient's confinement but it cannot present data related to nursing diagnosis, care plan, expected objectives or consequences and does not support nursing process. Thus it is recommended to provide ready nursing documentations sheets based on scientific principles in cares, putting the network on electronic portable instruments on the patient's bedside, remote access of therapeutical care giving team to the patient's information so that it is possible to use optimum of the abilities of electronic information system in order to improve the quality of cares and to record the nursing documentations.

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