

Nurses' Perception of Challenges in the Use of an Electronic Nursing Documentation System

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This qualitative study was based on the Technology Acceptance Model and conducted through directed content analysis to explore perceptions of nurses in Iran of the challenges of using an electronic documentation system. Participants were selected through purposive sampling via interview from a teaching hospital in western Iran. Data were analyzed using MAXQDA 10. Data consistency was ensured through validation methods and by the researcher's prolonged engagement in the subject. Twelve codes, four subcategories, and two main categories ("perceived usefulness" and "perceived difficulty") emerged from the analysis of the data based on the Technology Acceptance Model. "Perceived usefulness" consisted of the subcategories "subjective norms" and "experienced benefits"; and "perceived difficulty" contained the subcategories "rationalization" as well as "challenges in accepting change." According to the Technology Acceptance Model, to promote acceptance of this system, the benefits of usage should be highlighted. The biggest hurdle to acceptance is familiarity and comfort with previous methods.

KEY WORDS: Electronic health record, Electronic medical records, Hospital information system, Nursing process, Nursing records

As a quality assurance tool, nursing reports are important,¹ and proper documentation is vital; however, foreign and domestic studies reveal substandard clinical care reports and the absence of frameworks for the presentation and documentation of nursing care.^{2,3}

Nursing procedures can be documented through different methods, including electronic report writing, which is the best method for logging nursing reports.^{4,5} It also provides a proper means of documenting patient information without wasting time, enables the design and implementation of joint care

programs for nurses, determines the anticipated outcomes of care, and reduces medical errors^{6,7} as well as nurses' workload.^{8,9}

The global transition from paper to electronic documentation has been slow. Since 2004, medical teams have come to favor electronic documentation in matters of patient care and studies demonstrate the emerging positive attitudes toward the use of electronic documentation systems.¹⁰ Nevertheless, despite the advances in health information technology, the documentation of nursing care is still performed using the traditional paper method in Iran.¹¹

In addition, the shortage of nurses is one of the biggest challenges in Iran's health system.^{12,13} Authorities are looking for ways to reduce nurses' workload, and since nursing reports are documented manually,¹⁴ the use of an electronic documentation system could save nurses' time.^{8,9} To accomplish this end, strategies are required to change nurses' attitudes toward the acceptance of electronic nursing documentation.

Davis's Technology Acceptance Model (TAM) is a reliable model for predicting the acceptance of technology.^{15–17} The use of technology often depends on the user's desire to accept and to use the available systems. The TAM explains the link between inherent psychological variables and the actual use of a system. According to Davis, "perceived usefulness" and "perceived ease of use" are the main factors affecting the attitude toward the use of a system and, depending on their presence, may lead to actual system use.¹⁸ These two elements are influenced by external factors, comprising experience and the voluntary or involuntary nature of the decision to use the technology in question.¹⁶ The TAM considers cultural as well as social inclination as a major factor; also, it focuses on what affects the users' accepting technology.^{19,20}

Venkatesh and Davis²¹ introduced an updated version of the model (TAM2) that explains the effects as well as functional features resulting from both social effects and cognitive instrumental processes. The TAM2 incorporates additional theoretical constructs spanning social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use).²¹

Despite the widespread use of computers for logging nursing procedures as a means of compensating for the shortage

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The present study is part of a nursing PhD thesis and a research project approved by the Research Council of Shahid Beheshti University of Medical Sciences.

The authors have disclosed that they have no significant relationships with, or financial interest in, any commercial companies pertaining to this article.

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DOI: 10.1097/CIN.0000000000000358

of nurses in Iran, implementation of documentation systems is still a challenge. The present study was therefore conducted to explore nurses' perceptions of the challenges involved in the use of the electronic nursing documentation system based on the TAM2.

MATERIALS AND METHODS

This study was conducted using qualitative directed content analysis. The participants were selected through purposive sampling from among nurses who were willing to express their experiences, had enough knowledge about the existing status of report writing and its challenges, and had first-hand experience with the documentation and evaluation of nursing reports. The study was set at a teaching hospital in western Iran. Table 1 presents participants' demographic details.

Data Collection

The data required for the study were collected through in-depth semistructured interviews and analyzed simultaneously. Examples of the interview questions are as follows: "What do you include in your records?" "To what extent do the records match the standard nursing records?" "What cases have challenged the recording process?" and some other leading questions such as "Will you please explain more about that?" Data collection continued until data saturation occurred.

To analyze the data, directed content analysis based on TAM2 was utilized. The systematic classification of the data yielded the codes and themes, and the meaningful units as well as initial codes were thus extracted. The codes were then categorized into two final categories pertaining to the main concepts of the TAM2.²²

Each of the interviews lasted from 15 to 30 minutes and was recorded. The data obtained were analyzed by MAXQDA 10 (VERBI GmbH, Berlin, Germany). The interviews were recorded and later were transcribed on paper. Then, a file was

created in MAXQDA and the interview was added in a document system. Based on the participant quotes, codes were selected and transformed to the code system. At last, the codes were classified into groups and subgroups based on their similarities. At the end of interview 15, no new data were obtained and the quotations were repetitive. To ensure saturation, three more interviews were conducted; thus, after 18 interviews, the process ended.

Consistency and accuracy of the data were ensured through four validation methods by Lincoln and Guba²³; the results were reviewed by participants and checked externally by supervisors to verify validity and credibility. Additional supervisors and professors were asked to take an in-depth look at the interviews as well as the way the information was extracted to allow assessment of the results. Keeping related documents as well as other sources of study ensured the confirmability of the study results. Being in touch with the participants, attempting to elicit their ideas, and paying attention to each individual's opinion are among other factors to enhance the confirmability of this study.²³ Ethical considerations were observed throughout the study by obtaining written informed consent from the participants and by assuring the confidentiality of data.

RESULTS

Twelve codes, four subcategories, and two main categories ("perceived usefulness" and "perceived difficulty") emerged from the TAM2-based analysis of the data. Table 2 presents main categories, subcategories, and codes.

Perceived Usefulness

The participants defined the category of "perceived usefulness" as the benefit expected to be derived from using an electronic nursing documentation system and ascribed the subcategories of "subjective norms" and "experienced benefits" to it.

Subjective Norms

Subjective norms refer to the individual's perception of the perspectives that the influential members of the group have of his/her behaviors and behavioral rules.²⁴ The codes in this subcategory include "accuracy and time-saving capacity," "reliability and legitimacy," and "the transferability of all the patient details in brief" using electronic reporting.

Due to the nature of their job, nurses need to use accurate methods of documentation with a time-saving capacity so that they can dedicate more time to direct patient care. One of the nurses stated that hospital directors believe that the use of an electronic documentation system both reduces the time being spent on transcribing nursing reports and allows them to dedicate more time to patient care. Commenting on the increased accuracy achieved with

Table 1. The Demographic Details of the Participants

Variable	Range of Variation	n	%
Age (in year)	26–35	9	49.9
	36–45	7	38.9
	>45	2	11.2
Gender	Female	14	78
	Male	4	22
Level of education	Associate's degree	2	11
	Bachelor's degree	15	83
	Master's degree	1	6
Work experience, y	1–5	3	16.6
	6–10	5	27.7
	11–15	5	27.7
	16–20	4	22
	>20	1	6

Table 2. The Main Categories, Subcategories, and Codes

Main Category	Subcategory	Code
Perceived usefulness	Subjective norms	Improved accuracy and time-saving capacity
		Reliability and legitimacy
		Transferability of all the patient details in brief
		Interest in use due to the novelty of the technology
	Experienced benefits	Full systematic registration Flexibility
Perceived difficulty	Rationalization	The need for training
		Insufficient number of computers
		Challenges associated with the system's security
	Challenges in accepting change	Changes in current practices
		Difficulty starting new tasks Resistance

such systems, one participant commented, “Electronic reporting allows for a greater accuracy, inpatient admission, discharge and it can save us time since it is faster.”

Given their experience with legal proceedings, the interviewed officials believed that the only legal document that can be used to defend a nurse is the nursing report. The new nursing documentation system can be accepted and used by nurses only if it is reliable and has a legitimate status in legal cases. One of the nurses said, “These reports allow for the nurses in the next shift a reliable follow-up on everything; for example, been checked up on, or receiving the necessary training. It’s almost a standard and reliable method. A good electronic report is one that can be used as evidence and come to your defense whenever there is a legal problem.”

Regarding the transferability of all the patient details, in brief, one participant argued, “An electronic report is one that conveys everything that has been done for the patient and also contains the patient’s entire details. It is brief and contains all the essentials without unnecessary explanations.”

Another subcategory that emerged in this category was “interest in use due to the novelty of the new technology.” One participant commented on this subcategory, “It’s a good addition that is very useful. It’s a new technology that can be of great help and we like to use it because it’s all new to us.”

Experienced Benefits

This subcategory consists of categories such as “full systematic documentation” and “flexibility.” The full systematic

electronic documentation implies a report that contains all the procedures performed on the patient and follow-up actions. One nurse stated, “An electronic report should discuss whether the doctor has been notified of the patient’s critical state. For instance, it should report the actions that have been taken for the patient and the feedback. And you should be able to enter all the data, diagnoses, procedures, care measures, and follow-ups that are required for the patient. This helps the next shift nurses to be informed of what has been done and what should or shouldn’t be done.”

A standard electronic report applies to numerous patients in various conditions and in different hospital departments; in other words, such report machine is flexible. One participant discussed the flexibility of these reports, “An electronic report should be a little flexible and should apply to different wards, especially the ICU and the emergency ones.”

Perceived Difficulty

The category of perceived difficulty refers to the problems and barriers with which nurses are faced in their use of the electronic documentation system and includes the subcategories of “rationalization” and “challenges in accepting change.”

Rationalization

Participants had different reasons for refraining from the use of the electronic documentation system. This subcategory contains categories including “need for training,” “insufficient number of computers,” and “challenges associated with the system’s security.”

The need for training means that nurses need to be instructed on how to use the electronic documentation system. “Since the program has been designed using the Clinical Classification System and the nurses were not familiar with it, they should be taught how to use such new technology and how to work with this new system.”

Another participant described her experience of the insufficient number of computers, “There are very few computers available here for personnel’s use, and this scarcity causes problems because you have to wait in line to get to write your report and the waiting takes up a big portion of time.”

The inability to sign and stamp nursing reports is a major legal challenge of writing electronic nursing reports, because, in legal cases, the writer of every report should be easily identifiable. This impossibility provides a challenge that threatens the system’s security.

One participant noted, “It is vital for any report to have the personnel’s signature and stamp, and we have requested for a software to be designed that can input signatures, but so far to no avail. The issues are that, when the computer is on, no one bothers to log out first and log back in under their own name; they just open their patient’s file and write their report under the previous colleague’s username.”

Challenges in Accepting Change

Changing routine work processes leads to a number of problems and obstacles. Nurses are accustomed to traditional or nonstandard computer methods and forcing them to readjust themselves to new methods is challenging for them. This subcategory includes “changes in current practices,” “difficulty starting new tasks,” and “resistance.”

Changes in current practices imply the replacement of old methods with new ones or changes in how an action is performed. One participant explained, “It takes time for everyone to get used to a new software or to the changes implemented in a software, because when changes take place and new technologies arrive, they no longer know how to use them, especially if the new software is much different from the previous one.”

Emphasizing the effect of having accustomed to an old system, another participant said, “Everyone is used to the old method and the new one is challenging for us. In the past, when the old company was replaced with a new one, it was difficult for the personnel to readjust. It was much easier for the new nurses to adjust because they didn’t know the old method. But it was excruciatingly difficult for the more experienced nurses because they had used to the old ways.”

On the difficulty of starting new tasks, one participant remarked, “Any task is difficult at first. If they don’t like it, they come up with a million excuses, like ‘we don’t have time.’ And here is another trouble we could do without.”

Resistance is another theme that was discussed in the interviews, “They won’t easily accept it. The wards are busy, and if they have time, they write their reports properly; otherwise, when they don’t have enough time to write a detailed report, they botch it and write something just to get it over with; they don’t care whether it’s accurate and comprehensive or not.”

One of the reasons for this resistance is the unfamiliarity with the new software, “They aren’t familiar with the new software and don’t know how it works. That’s why they find it hard to accept such a change because they are not familiar with the software or the new writing method they should adopt.”

DISCUSSION

One of the main duties of nurses along with their nursing activities is to register reports about patients. Previous studies have demonstrated the unfavorable quality of nurses’ report registration in Iran as well as across the world.³ In the majority of hospitals in Iran, nursing reports are documented manually. Even though the hospital in this study had an electronic documentation system, and nursing reports were registered on a computer, the nurses were unfamiliar with standard electronic report registration. In addition, despite their efforts to provide high-quality patient care,

their documentation was insufficient to support them in a court of law, and due to improper registrations in many cases, the judge’s ruling would not be in their favor. The present study was therefore conducted to explore nurses’ perceptions of the challenges in the establishment of an electronic nursing report registration system.

The obtained results based on TAM2 showed two main categories, including “perceived usefulness,” and “perceived ease of use.”

Perceived usefulness is the degree to which an individual believes that using a particular system will improve his performance; perceived ease of use is the amount of effort that the user expects to be relieved of by choosing to use the system.^{16,25}

Based on TAM2, subjective norms comprise an important factor involved in the acceptance of a new technology. Subjective norms refer to the individual’s perception of the perspectives that the influential members of the group have of his/her behaviors and behavioral rules. Having been encouraged to use the new technology, it is first necessary to identify the group’s most influential members and thus use their influence so that the other members accept the change. A study showed that identifying influential members of a group allowed the rest of the group to better adapt to innovations and to accept new phenomena more easily.²⁶ Studies showed that in the medical profession, people with greater knowledge, better manners, and good social relations are considered influential²⁷; however, in the nursing profession, skills and experience play a part too.²⁸

Understanding nurses’ own perspectives can also help identify and resolve the obstacles faced in the use of a new system. Based on TAM2²¹ and Lewin’s theory of change,²⁹ devising plans can help improve the acceptance and use of new methods.

With respect to codes such as increased accuracy and time-saving capacity, reliability and legitimacy, and the transferability of all the patient details, a study showed that systematic nursing documentation can reduce nurses’ workload, save them time, improve the quality of their documentation and, thereby, the quality and continuity of patient care, increase the reliability of the documents, and facilitate the writing of patient admission reports.⁹ These are all part of the perceived usefulness of an electronic reporting system, which is also one of the two main concepts in TAM2.^{18,21}

Previous studies have not discussed the importance of the brevity of nursing reports.⁹ The reports written in the study hospital tended to include unnecessary details, such as whether the patient had been visited, had the prescription been ordered, were the vital signs checked; however, electronic registrations were believed to effectively reduce the length of nursing reports. The concept of perceived usefulness in TAM2 confirms this theme.

Regarding the reliability and legitimacy of reports, the results obtained were consistent with those found in other studies, and the reliability of the system was found to affect its usefulness and subsequent acceptance.^{30,31} According to the interviewed nurses, the system's ability to legally defend nurses also affects their acceptance of it. Due to the discussed features, electronic nursing report can be of help in the legal defense of nurses; this ability helps increase the acceptance of the system.

Other studies also noted nurses' interest in the use of new technologies as a factor affecting technology acceptance,^{15,32–35} and since the examined hospital took advantage of hospital information system, the nurses favored the use of new technologies and wished to avoid traditional manual methods.

Full systematic registration was another theme that was discussed in several other studies.^{9,16,18,26,30,31,36,37} Given the importance of nursing report registration, full systematic report registration was another concept of the perceived usefulness of the system also confirmed in TAM2 and believed to affect the nurses' acceptance of the new system.

The results obtained in this study on the flexibility of the system were consistent with those obtained in some other studies.³⁸ Given the shortage of nurses, their heavy workload, and the registration of nursing reports taking place at the end of every shift, only a system that resolves these problems and matches their work conditions can be easily accepted and used by nurses. If the electronic nursing report registration system acts poorly to solve the nurses' problems, the nurses will not accept it or will show great resistance.

After being trained on how to use the new technology, they showed apparent results that were consistent with those obtained by other studies.³⁹ Another study confirmed the challenges concerning the security of system.³⁸ Holding training courses and assigning usernames and passwords to each nurse can increase the system's acceptability. Venkatesh and Davis²¹ believe that resolving all the problems and facilitating use can improve the acceptance of a new system.

The insufficient number of computers is a problem that was not discussed in other studies; however, the need for proper facilities and resources for the use of electronic systems and computers was emphasized in other studies.^{40,41}

The results of this study were consistent with those obtained in other studies with regard to computer knowledge^{42,43} or the nurses having become accustomed to old methods.^{44,45}

Since the interviewed nurses already used a computer report registration system, introducing an electronic report registration system to them was met with less resistance and had better acceptance. If the old system and the new one are similar, the new system is more easily accepted.

A study showed that habits were the biggest obstacle against the acceptance of technology because people tend

to get used to their old technologies over time.⁴⁶ The results of a study demonstrated that the electronic registration system is useful because it is standard; yet, its acceptance takes about a year.⁴⁷ The findings of several other studies also confirmed the need for at least 1 year to pass until a new system is considered accepted.^{40,48}

The results obtained in the current study on the difficulty of starting new tasks and resistance were in line with the outcomes found in some other studies.^{40,49} According to Lewin's theory of change,²⁹ starting new tasks and implementing changes faced with resistance reduce the likelihood of the acceptance and use of the new methods. As stated by other studies, resistance to change is an actual phenomenon, and according to the theory of change, the best way to promote the acceptance and use of electronic report registration is to communicate with those involved in the system and to foster the feeling of a need for change. The nurses' awareness of the benefits of electronic reporting and the feeling of a need for change help to persuade them to use the new system. By introducing the new system and establishing changes in report writing, nurses gradually incorporate use of the electronic system in practice. These stages coincide with one of the main concepts in TAM2, namely, "perceived usefulness." The nurses' resistance, due to familiarity and comfort with the old system, is also manifested in the second concept elaborated in TAM2, namely, "perceived difficulty." When the nurses compare the new and old electronic report systems and perceive the benefits of the new method, they gradually become more willing to use it. Thus, they replace the old method with the new one.^{29,50}

The main limitations of the present study are small number of participants and participants' unwillingness to express their actual views, one that is common among all qualitative studies. Future studies are recommended to examine the difficulties in the acceptance of change and the excuses made to evade change with the collaboration of hospital authorities and nurse representatives, so that the potential limitations, such as few samples, reluctance in expressing views in using a standard electronic nursing report registration system can be identified and resolved through appropriate strategies.

CONCLUSION

Promoting nurses' use of computers, particularly in the registration of their reports, may appear a routine task that is far from advanced; however, it helps prepare them for the acceptance of new technology and facilitates the adoption and implementation of standard electronic nursing report registration systems. The results obtained in this study indicated that, due to its perceived benefits, nurses are willing to use the electronic reporting system but that certain problems in the implementation and use of the software should first be resolved to make the system more easily acceptable.

It thus appears that improving the acceptance of electronic nursing report registration by Iranian nurses requires a greater emphasis on the benefits of the system, since having become accustomed to the previous system and dealing with change appear to be the main obstacles against the acceptance of the new method.

Acknowledgments

The authors would like to express their gratitude to Dr. Virginia Saba and all the participants and those who helped conduct the study.

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