Nurses' strategies in prevention of nursing error recurrence in chronic critical care: A qualitative study

Alireza Nikbakht-Nasrabadi[1], Hamid Peyravi[2], Sina Valiee[3]

1 Professor, Department of Medical Surgical Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran
2 Associate Professor, Department of Critical Care, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran
3 Assistant Professor, Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Kurdistan University of Medical Sciences, Sanandaj, Iran

Abstract

BACKGROUND: Nursing errors are common in critical care units while most of them are preventable. Critical care nurses are uniquely positioned to prevent the recurrence of nursing errors. The purpose of this study was to explore the strategies considered or used by nurses in order to prevent the recurrence of nursing errors in chronic critical care units.

METHODS: A qualitative design using content analysis method was employed in the present study. In-depth interviews were conducted with a sample of 17 participants, recruited through purposive sampling. This study was conducted in 2011-2012 in Iran.

RESULTS: Results indicated that the strategies used by critical care nurses to prevent recurrence of nursing errors include personal strategies (paying more attention, updating information, reminding and hinting, experience sharing, prevention), and expectations from the organization (increasing intrinsic motivation and decreasing work pressure).

CONCLUSION: Nursing administrators must be aware of the individual strategies used by the nurses to develop and promote their implementation and underlying these strategies. Identifying and understanding the strategies used by nurses can help them in their support provision. Explored strategies can be used to develop interventions for prevention of nursing errors. Further exploration of the question of how the nursing context will influence strategy selection and why is necessary. Regarding the strategies used by nurses, nurse managers must utilize them in planning in order to develop an error free care.

KEYWORDS: Nursing Error, Critical Care, Strategy, Content Analysis

Introduction

Errors in health care are of great importance, since they may have noncompensable consequences.[1] As a matter of fact, nurses and all health care providers inadvertently commit errors in their practice.[2] In addition, nursing errors will increase the time interval of staying at the hospital which can be stressful for both patients and nurses.[3] Currently, clinical errors are addressed as a significant social issue and concerns about them are growing.[4]

Nursing errors can occur at any point of the nursing process, in the form of an action or actions which have a negative impact on patient safety or quality of care.[5] Nursing errors in critical care units mostly occur due to further need of patients for nursing cares.[6] Patients in critical care

Corresponding Author:
Sina Valiee
Email: valiee@muk.ac.ir

suffer from a life-threatening condition that requires constant monitoring and comprehensive care. Some of these patients improve from an acute status into chronicity while in the critical care units. Chronic critical illnesses account for approximately 6% to 10% of all patients treated in the critical care units, annually; however, recent studies show that this percentage is increasing. They often experience recurrent episodes of instability, a need for prolonged medical and nursing care, multiple-organ dysfunction or failure, ongoing need for life-sustaining interventions, and uncertain trajectory for recovery. Outcomes for patients with chronic critical illness are associated with a high risk of disability, distress, and death. Therefore, they need more precise care and are more disposed to nursing errors.[4,7] However, it has been stated that the majority of errors are never reported, and about half of them are considered as preventable.[8,9] Consequently, considering the inevitability and preventability of nursing errors particularly in critical care units, the main question is: 'What are the strategies considered or used by nurses in preventing the recurrence of nursing errors in chronic critical care?'.

Henneman et al. reported that nurses use different strategies to identify, prevent, and correct medical errors in critical care units and they play a pivotal role in the recovery from medical errors and ensuring the patients' safety.[10] In another study, nurses used surveillance, anticipation, double checking, awareness of the big picture and experiential knowledge to identify medical errors in an academic emergency setting.[11] Frith et al. mentioned nurse staffing as an important strategy to prevent medication errors in community hospitals.[12] In previous studies, there is little information about the personal strategies that critical care nurses use to prevent the recurrence of nursing error in critical care units. Moreover, their identification, which has been neglected until now, is important for prevention of nursing errors in critical care. Therefore, we planned and conducted this study to explore strategies used by nurses to prevent nursing error recurrence in critical care units.

Materials and Methods

With regard to the aim of this research, a qualitative research design with a content analysis approach is used which offers instruments for examining experiences and results in the acquisition of valuable and in-depth data from participants.[13,14] The present study was conducted in 2011-2012.

Purposive sampling, by considering the maximum variation, was used to recruit nurses who were working in chronic critical care and had at least one year of work experience in critical care units of hospitals which are affiliated to Tehran and Kurdistan Universities of Medical Sciences, Iran. Participants were recruited from three urban hospitals in two provinces of Iran. Attempts were made to seek participants with a variety of ages, of both genders, and work experience in critical care. The participants consisted of 17 critical care nurses (Table 1).

First, written informed consents were obtained from all participants. Data was collected through deep semi-structured interviews. The interviews with 17 critical care nurses were conducted in Persian and continued until completion of data collection and theoretical saturation. The principal researcher managed the member checking. Interviews were conducted for 6 months. Each interview was held within 30 to 60 minutes, recorded on the tape, and its content was immediately transcribed on paper and then analyzed. The interview took place at the first meeting, and the second was done in order to resolve an ambiguity in the first interview and for member check. Interviews, depending on the preference of the participants, took place either in the hospital or nursing department. We used main and probing questions to acquire an in-depth understanding of the experiences of the participants. For example: Please tell me about your experience of nursing errors?; What do you do to avoid them happening again?; What should

Table 1. Demographic characteristics of the participants

Participant	Gender (male/female)	Age (year)	Work experience (year)	Work experience in critical care (year)	Center
1	F	30	5	3.0	Tehran
2	M	43	11	7.0	Tehran
3	F	45	15	3.0	Tehran
4	F	34	7	6.0	Tehran
5	M	35	8	5.5	Tehran
6	M	32	8	7.0	Tehran
7	M	28	2	1.0	Tehran
8	M	29	10	6.0	Kurdistan
9	M	25	2	2.0	Kurdistan
10	F	29	7	7.0	Kurdistan
11	M	42	16	16.0	Kurdistan
12	F	46	23	12.0	Tehran
13	F	43	16	5.0	Kurdistan
14	M	32	12	9.0	Tehran
15	F	38	14	12.0	Kurdistan
16	F	35	13	10.0	Kurdistan
17	F	44	18	15.0	Tehran

Table 2. An example of category development

Meaning units	Primary code	Subcategory	Main category
"They must motivate their staff so that they can focus on their work, and not to burst somebody's bubble."	Motivating	Intrinsic motivation	Expectation from organization
"Value and cost are important for critical care nurses, they should be distinguished from the nurses who work in general wards!".	Distinguishing		
"… I think organizations should reduce the working shift of nurses as much as possible…"	Pressure reduction	Decreasing work pressure	
"… Organizations should supply enough staff to reduce work pressure, especially during the night shifts…"	Reducing pressure of night shifts		

we do to prevent the recurrence of nursing errors?. Hence, the participants were asked to present other points which came to their minds and had not been addressed during the interview.

Qualitative content analysis was used to analyze the data; the qualitative content analysis is beyond mere word counting and is one of the common research methods for analyzing textual data.[15] Following data transcription, inductive content analysis, defined by Elo and Kyngas, was used.[15] This process includes three stages of open coding, creating categories, and abstracting. In open coding, notes and headings are written down while reading the text; consequently, they are read completely and the required number of headings is transcribed in the margin of text, and categories are created freely in this stage. After

open coding, the list of categories fitting to higher level headings is classified. Abstraction means formulating a general explanation of the research subject through creating categories. Each category is named according to its lexical content. Subcategories are classified in a similar manner and they form categories which are similarly classified as the main categories. The abstraction process was pursued to the extent that was logical and possible.[15] An example of category development is presented in table 2.

This study was approved by the research committee of the Tehran University of Medical Sciences and the administration of each hospital. Consent forms were obtained from all voluntary participants, especially for recording their voice. The participants were assured that they could

leave the study at any time and their names and other significant details that might reveal their identity would not be published in the study report. All names were converted into codes during the transcription of the interviews, data locked in separate locations, and the coded information was used for data analysis and discussion.

Strategies were used in this study to demonstrate scientific trustworthiness, based on the criteria set in qualitative nursing references.[13,14] In order to increase the reliability of the data in the present study, these points were taken into account: allocation of an appropriate place and adequate time for collecting the data; suitable relationship with the participants; using the complementary views of the colleagues; going over the handwritten materials for the participants and examining the data by all researchers for increasing the acceptability of encoded data. The research was conducted by a PhD candidate of nursing with clinical experience in critical care nursing, and was supervised by an associate professor. In order to verify the findings of the data, the supervisor rechecked all the stages of transcribing the interviews, coding, and development of categories. Whenever different codes emerged, the raw data were examined in the presence of the research team until they reach an agreed code.

Results

The final analysis revealed the strategies that prevent nursing errors for participants. The strategies which were identified from the interviews and confirmed with participants are helpful in avoiding nursing error recurrence. Strategies used by nurses are classified as personal (paying more attention, updating information, reminding and hinting, experience sharing, and prevention) and expectations from the organization (increasing intrinsic motivation and decreasing work pressure).

Expectation from the organization

The main part of the views of the nurses about prevention of error was that they expect the organization to make some changes. They expected the organization to increase their intrinsic motivation and decrease their work pressure.

Intrinsic motivation

Increasing intrinsic motivation was one of the major expectations of the participants in order to deliver an error free care. Participant 6 stated: "They must motivate their staff so that they can focus on their work, and not to burst somebody's bubble". Participant 7 stated: "Also, financial incentives are very important…value and cost are important for critical care nurses, they should be distinguished from the nurses who work in general wards!".

Decreasing work pressure

Another important expectation of nurses was the reduction of work pressure via the organization. Participants 6 mentioned that: "We have an important role in preserving patients' life, so I think organizations should reduce the working shift of nurses as much as possible; if this was done, nurses would pay attention to their patients and not to their hard shifts!".

Personal strategies

One of the important aspects of strategies used to prevent nursing errors is personal strategies and includes paying more attention, updating information, reminding and hinting, and experience sharing.

Paying more attention

Paying more attention to care was one of the main strategies used by nurses in prevention of recurrence of the same or similar errors by nurses. For example, one of these strategies was about drugs. In this respect participant 1 stated: "First, I see that the new vial of ranitidine made by the new medicine factory was the same as the other drugs, so we labeled it with a red marker to prevent medication error by nurses in the next shifts". Another aspect of paying more attention by nurses was considering different criteria for decision making. Participant 2 stated: "… there are many criteria for judgment, but no one criteria is sufficient. We should spot clinical and other

criteria before procedures; then, decide on the care delivery method for prevention of errors". Another technique to pay attention was thinking of procedures before performing them. In this respect, participant 4 said: "…when I do something like that in patients, I think of the process and the steps, until the error does not occur".

To update information

Another aspect of the participants view about prevention of error recurrence was updating information. Updating was possible by studying, searching in databases, taking retraining courses, or questioning of colleagues. Participant 17 declared: "Because I've just come from another ward, I study and will increase my information about new procedures and care. Now I've changed and I'm better". Participant 7 stated: "Studying is important. I think the best way to prevent medication and nursing errors is studying!". Moreover, participant 14 said: "…we should improve our information… must increase our understanding about patients and their disease".

Reminding and hinting

Reminding was one of personal strategies used by participants for prevention of nursing errors. Nurses prevent nursing errors by reminding their colleagues and physicians of the patient's situation. Participant 1 "For example, I tell the doctor that the patient has diabetes and has taken dexamethasone for two weeks. So, his/her blood sugar would not be controlled." Hinting was another strategy used by nurses. Participant 7 stated: "The first time, one of the nurses hinted that TNG should be based on monitoring the patients rate, so I hinted this point to other nurses because it stuck in my mind."

Experiences Sharing

Most participants pointed out the issue of personal strategies by gaining experience and sharing them with others. Participant 16 said: "Well, I remember my error, I gained an experience… however, it resulted in me not repeating this mistake again". Participant 1 also stated in this respect that: "For example, about

that patient, that I told you about, I was very sad and I told my friends about it so that they apply further precision in the same patients…". The experience sharing was utilized to prevent the recurrence of the same errors by participants and their colleagues. Participant 5 stated: "… I try to tell the story in any way to my colleagues until they know and will not do it in the same way…".

Prevention

Participants in this study emphasized the importance of prevention of error recurrence and they thought it necessary. In this respect, participant 4 stated: "…The best option for an error not to occur is prevention…because it has more consequences! ...So, prevention is better than to cover the errors; it is easier, less costly, and with less psychological pressure…". Participant 8 also stated: "…We have patients in critical situation; so, you must think of this situation and prevent the possible errors of this situation…".

Discussion

In the view of the participants, organizational and personal strategies could prevent recurrence of errors. Expectations of nurses from the organization consist of increasing intrinsic motivation and reducing work pressure, and personal strategies include paying more attention, updating information, reminding and hinting, sharing experiences, and prevention.

The occurrence of medical errors is inevitable; therefore, health care providers need to focus on optimizing the system to reduce errors.[16] The participants mentioned that important solutions to prevent errors through their organization was to increase intrinsic motivation and decrease work pressure. Organizational factors are considered as key factors in error occurrence and reporting errors.[17] There are two approaches to the problem of human errors including personal approach and system approach. Personal approach concentrates on the errors of individuals, blaming them for indiscretion, inattention, or moral weakness. System approach focuses on circumstances where the person works

and tries to build a line of defense against errors and reduce their complication.[18] Therefore, nurse managers should adopt a systematic approach to identifying the work conditions of critical care nurses, and take action to prevent or mitigate the effects of errors.

Note that the errors seem to be caused by inappropriate mental processes such as inattention, poor motivation, omission, negligence, and thoughtlessness.[18] Therefore, nurse managers should try to motivate critical care nurses in their work and care delivery. Based on previous studies, increase in motivation can increase the incentive to keep working and pay attention to patients' safety. Kudo et al. showed that nurses' motivation for preventing errors had a relationship with certain factors of safety climate such as reporting, nursing conditions, and communicating with physicians.[19] Nursing managers should take steps to avoid errors while identifying motivating factors for the prevention of errors by nurses.

Another organizational factor in prevention of errors from the prospect of the participants was decreasing work pressure. According to the nurses' perception, work load was one of the factors underlying nursing errors, thus reducing their work load was introduced as a strategy to prevent their errors. The current shortage of nurses has led to a considerable work burden being placed on the nurses, and the possibility of error is higher and patients are more vulnerable in the critical care units.[20,21] Consequently, fatigue and work pressure can lead to increment in error of nurses in critical care units.[22] Therefore, reducing nurses' work pressure can lead to an improvement in patient safety.[1] In the study of Toruner and Uysal, 19.3% and 16.8% of nurses, respectively, mentioned that low nurse-to-patient ratios and reducing work hours are effective in the prevention of medication errors in pediatric wards.[23] Therefore, nursing managers should provide adequate human resources, comply with the standards of nurse to patient or nurse to bed, and must reduce workload of nurses in critical care units.

The main point in personal strategies was their view about the importance of prevention. They tried to achieve this goal by increasing their accuracy in performing the procedures, updating their Information, reminding and noting the status of their patients to themselves, colleagues, or physician, and sharing their experience with others.

Paying attention is important in care delivery and especially in drug administration. Factors such as fatigue of care provider, distraction in drug administration, inadequate lighting, and deterioration of patient acuity can affect medication errors. Furthermore, distractions and interruptions can disturb the clinician's concentration and lead to severe mistakes.[24] Therefore, factors that reduce the attention of critical care nurses in care delivery should be identified and eliminated. One of the methods of care is patient-centered care that is accompanied by an increase in accuracy and is effective in improving quality and safety of patient care.[25] Another study determined that strategies like surveillance are used by nurses as a strategy for prevention of nursing errors. Surveillance includes continuing acquisition, interpretation, and synthesis of data about patients for clinical decision making. Surveillance differs from monitoring in purpose and scope. Monitoring is an essential activity in the process of surveillance, but monitoring is insufficient for conducting effective surveillance.[26] Therefore, considering that one of the activities of critical care nurses is patient monitoring, nursing managers can develop this behavior of surveillance for prevention of nursing errors.

One of the other personal strategies of critical care nurses for preventing errors was to update their information. Lack of knowledge has been discussed as one of the most common causes of medical errors.[27] In the study of Toruner and Uysal, nurses reported that having sufficient information about the safe use of drugs was one of the important methods for avoiding medication errors.[23] Moreover, studying and updating information, especially about new drugs, can

reduce the chance of medication errors.[24] Updating information has an individual aspect; nurses seek their information personally. Furthermore, they considered educational courses to be effective. Subsequently, nurse managers in addition to providing educational courses, which are appropriate for nurses' needs, should also prepare and provide personal references (such as new references, software, and educational materials in critical care units), and obtain the ability to respond quickly to nurses' informational needs in confronting different situations.

Participants mentioned reminding and hinting about patient situations for themselves, colleagues, or doctors as a personal strategy. Patient care is teamwork and interprofessional communication has a relationship with patient safety and medical errors.[28] Furthermore, nurses have a crucial role in the health care team because nurses are in permanent contact with patients, in contrast with all other members of the caring team who do not stay beside the patients after visiting them.[29] The establishment of interprofessional communication can lead to gaining more information about the patient's situation for all the health care team members, and thus, prevent recurrence of nursing errors.

Overall, there are different strategies for the prevention of errors such as checklists, interdisciplinary rounds, clinical information systems, and clinical decision making support systems.[26] These strategies can be used, but nursing managers must further explore the reasons of errors and orientations about strategic options, and utilize the appropriate strategies for the current status of critical care units.

It should be remembered that the generalizability of the findings of the study is limited due to its qualitative design and small sample size in critical care units. Therefore, it is recommended that more studies be undertaken for further exploration of nurses' experience in choosing and using strategies for prevention of nursing error recurrence. Moreover, more studies are required for further exploring certain strategies such as reminding and hinting and

sharing experiences. In addition, more studies are needed to explore nurses views about strategies that they think should be implemented by their organization and administration.

Conclusion

In this study the considered or used strategies of critical care nurses to prevent nursing errors were explored. Considering the inevitability of nursing error, one of the most appropriate methods to select strategies for preventing errors in addition to exploring the view of nurses is to identify the strategies used by them. As a result, strategies applied by nurses would be accepted and implemented by them more easily. These strategies could be appropriate for development and implementation. Identifying and understanding the strategies used by nurses can help in providing support for them. Hence, explored strategies could be used to develop interventions for preventing nursing errors. Further exploration of how the nursing context effects strategy selection and its reasons are necessary. Therefore, with regard to the strategies used by nurses, nurse managers must plan to create an error free care.

Conflict of Interests

Authors have no conflict of interests.

References

1. Eslamian J, Taheri F, Bahrami M, Mojdeh S. Assessing the nursing error rate and related factors from the view of nursing staff. Iran J Nurs Midwifery Res 2010; 15(Suppl 1): 272-7.
2. Crigger NJ. Always having to say you're sorry: an ethical response to making mistakes in professional practice. Nurs Ethics 2004; 11(6): 568-76.
3. Rathert C, May DR. Health care work environments, employee satisfaction, and patient safety: Care provider perspectives. Health Care Manage Rev 2007; 32(1): 2-11.

4. Wiencek C, Winkelman C. Chronic critical illness: prevalence, profile, and pathophysiology. AACN Adv Crit Care 2010; 21(1): 44-61.

5. Wagner LM, Damianakis T, Pho L, Tourangeau A. Barriers and facilitators to communicating nursing errors in long-term care settings. J Patient Saf 2013; 9(1): 1-7.

6. Hov R, Hedelin B, Athlin E. Good nursing care to ICU patients on the edge of life. Intensive Crit Care Nurs 2007; 23(6): 331-41.

7. Camire E, Moyen E, Stelfox HT. Medication errors in critical care: risk factors, prevention and disclosure. CMAJ 2009; 180(9): 936-43.

8. Kagan I, Barnoy S. Factors associated with reporting of medication errors by Israeli nurses. J Nurs Care Qual 2008; 23(4): 353-61.

9. Johnstone MJ, Kanitsaki O. The ethics and practical importance of defining, distinguishing and disclosing nursing errors: a discussion paper. Int J Nurs Stud 2006; 43(3): 367-76.

10. Henneman EA, Gawlinski A, Blank FS, Henneman PL, Jordan D, McKenzie JB. Strategies used by critical care nurses to identify, interrupt, and correct medical errors. Am J Crit Care 2010; 19(6): 500-9.

11. Henneman EA, Blank FS, Gawlinski A, Henneman PL. Strategies used by nurses to recover medical errors in an academic emergency department setting. Appl Nurs Res 2006; 19(2): 70-7.

12. Frith KH, Anderson EF, Tseng F, Fong EA. Nurse staffing is an important strategy to prevent medication error in community hospitals. Nurs Econ 2012; 30(5): 288-94.

13. Holloway I, Wheeler S. Qualitative Research in Nursing and Healthcare. New Jersey, NJ: John Wiley & Sons; 2010.

14. Speziale HS, Carpenter DR. Qualitative Research in Nursing: Advancing the Humanistic Imperative. Philadelphia, PA: Lippincott Williams & Wilkins; 2007.

15. Elo S, Kyngas H. The qualitative content analysis process. J Adv Nurs 2008; 62(1): 107-15.

16. Fernandez CV, Gillis-Ring J. Strategies for the prevention of medical error in pediatrics. J Pediatr 2003; 143(2): 155-62.

17. Handler SM, Perera S, Olshansky EF, Studenski SA, Nace DA, Fridsma DB, et al. Identifying modifiable barriers to medication error reporting in the nursing home setting. J Am Med Dir Assoc 2007; 8(9): 568-74.

18. Reason J. Human error: models and management. BMJ 2000; 320(7237): 768-70.

19. Kudo Y, Kido S, Taruzuka SM, Saegusa Y, Satoh T, Aizawa Y. Safety climate and motivation toward patient safety among Japanese nurses in hospitals of fewer than 250 beds. Ind Health 2009; 47(1): 70-9.

20. Carayon P, Alvarado CJ. Workload and patient safety among critical care nurses. Crit Care Nurs Clin North Am 2007; 19(2): 121-9.

21. Garrouste-Org, Timsit JF, Vesin A, Schwebel C, Arnodo P, Lefrant JY, et al. Selected medical errors in the intensive care unit: results of the IATROREF study: parts I and II. Am J Respir Crit Care Med 2010; 181(2): 134-42.

22. Montgomery VL. Effect of fatigue, workload, and environment on patient safety in the pediatric intensive care unit. Pediatr Crit Care Med 2007; 8(2 Suppl): S11-S16.

23. Toruner EK, Uysal GC. Causes, reporting, and prevention of medication errors from a pediatric nurse perspective. Australian Journal of Advanced Nursing 2012; 29(4): 28-35.

24. Townsend T. Medication errors: Don't let them happen to you. American Nurse Today 2010; 5(3): 23-37.

25. Hughes RG. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville, MD: Agency for Healthcare Research and Quality; 2008.

26. Henneman EA, Gawlinski A, Giuliano KK. Surveillance: A strategy for improving patient safety in acute and critical care units. Crit Care Nurse 2012; 32(2): e9-18.

27. Naylor R. Medication Errors: Lessons for Education and Healthcare. London, UK: Radcliffe Publishing; 2002. p. 333.

28. Varpio L, Hall P, Lingard L, Schryer CF. Interprofessional communication and medical error: a reframing of research questions and approaches. Acad Med 2008; 83(10 Suppl): S76-S81.

29. Maeve MK. A critical analysis of physician research into nursing practice. Nurs Outlook 1998; 46(1): 24-8.