

Perspective of Nurses toward the Patient Safety Culture in Neonatal Intensive Care Units

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ABSTRACT

Background: Infants hospitalized in neonatal intensive care units (NICUs) are often severely ill, highly prone to various diseases, and exposed to complex and prolonged intensive care interventions. Consequently, they are susceptible to the lapses in teamwork and patient safety. Patient safety culture a fundamental step to improve patient safety. The present study aimed to evaluate the perspective of NICU nurses toward the patient safety culture.

Methods: This cross-sectional study was conducted in 2016. Participants were selected via census sampling, including 156 nurses working in the NICU of the teaching hospitals affiliated to Isfahan University of Medical Sciences in Isfahan, Iran. Data were collected using a demographic questionnaire and Hospital Survey on Patient Safety Culture (HSOPSC). Data analysis was performed in SPSS version 16 (SPSS Inc, Chicago, IL, USA) using descriptive statistics (mean and standard deviation).

Results: Among the 12 dimensions of the patient safety culture, the highest scores were observed in the 'teamwork within units' (98.5%), 'organizational learning-continuous development' (87.8%), 'feedback and communication about errors' (80.3%), and 'frequency of events reported' (78.8%). The lowest scores belonged to the dimensions of 'handoffs and transitions' (15.3%), 'non-punitive response to error' (21.5%), and 'staffing' (37.1%).

Conclusion: According to the results, adherence to the dimensions of the patient safety culture was poor in the studied hospitals. Therefore, the patient safety culture requires special attention by providing proper facilities, adequate staff, developing checklists for handoffs and transitions, and surveillance and continuous monitoring by healthcare centers. Furthermore, a system-based approach should be implemented to deal with errors, while a persuasive reporting approach is needed to promote the patient safety culture in the NICUs of these hospitals.

Keywords: Iran, Neonatal intensive care units, Nurse, Patient safety culture

Introduction

Infants hospitalized in neonatal intensive care units (NICUs) are often severely ill, highly prone to various diseases, and exposed to complex and prolonged intensive care interventions (1). The environment of NICUs may inadvertently pose risks to the health of neonates (2). Evidence suggests that the infants hospitalized in NICUs are more susceptible to medication errors and other events that threaten patient safety compared to the patients (3). In addition, the complications caused by medication errors usually occur faster and more aggressively in infants.

According to a study, 56% of the safety-threatening events that occurred in NICUs were

preventable, and only 8% of these events could be identified through voluntary reporting (4). In this regard, the findings of Farzi et al. (2015) also indicated that most medication errors were reported in pediatric intensive care units and intensive care units (ICUs), which would severely threaten the patient safety (5).

According to the Institute of Medicine (IOM), safety is defined as the prevention of harm to the patients with an emphasis on the systems of care delivery, including the prevention of mistakes, learning from mistakes, and creating a safety culture in healthcare organizations (6). Values, attitudes, perceptions, and common behavioral

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patterns toward the safety culture represent the concerted effort and attention of the healthcare team members to minimize patient harm (7).

The dominant culture in healthcare centers should encourage the voluntary self-report by nurses in order to help the other healthcare team members to learn from experience and prevent possible errors (8). A positive safety culture could prevent the adverse incidents that threaten patient safety and improve the quality of care (9). Essentially, achieving a positive safety culture involves assessing the current status of the safety culture in an organization (10).

Evaluation of the patient safety culture is an inherent element of improving the quality of care, and providing safe care should be prioritized in healthcare organizations (3). In the process of assessing the safety, some of the aspects of the patient safety that require further attention could be identified. In addition, this process enables healthcare managers to recognize the strengths and weaknesses of the safety culture and take corrective measures accordingly (10). It is notable that the rate of errors is reported to be higher in the healthcare organizations where there is poor adherence to the patient safety culture (11).

Safety evaluation of adult patients in ICUs shows an association between improving the patient safety culture and enhanced quality of care; such examples are the reduced rate of medication errors, decreased length of hospital stay, and lower risk of nosocomial infections (1). Despite the paramount importance of evaluating the patient safety culture in hospitals, data is scarce on various aspects of the patient safety culture in NICUs (3). In a study by Arshadi-Bostanabad et al. (2015) conducted in Tabriz (Iran), level of the patient safety culture was reported to be low among NICU nurses (4).

Nurses are the most influential members of healthcare teams in providing safe care and play a pivotal role in improving patient safety (12). Since they are in constant interaction with patients, nurses need to identify the challenges in the healthcare system as part of the solution to the patient safety problem. In a hospital with a proper safety culture, nurses should be able to freely express their opinions and announce the adverse events that might occur due to the problems in the healthcare system or human factors (13).

Continuous assessment of the safety culture is an initial step toward improving patient safety in healthcare centers (14). Several risks inadvertently threaten the safety of the infants admitted to NICUs. Therefore, the perception of nurses regarding the

patient safety culture is considered essential to ensuring patient safety in these units.

According to the literature review, no studies have investigated the safety culture in the NICUs in Isfahan city (Iran). The present study aimed to evaluate the perspectives of NICU nurses toward the patient safety culture. It is hoped that our findings would be useful and contribute to enhancing patient safety, while reducing the errors occurring in NICUs.

Methods

This descriptive, cross-sectional study was conducted in the NICUs of four hospitals affiliated to Isfahan University of Medical Sciences in Isfahan, Iran during June-July 2016. Participants were selected via census sampling, including all the NICU nurses. Inclusion criteria were providing an informed consent to participate in the research and a minimum work experience of three months in the NICU (4).

To complete the questionnaire, the researchers cooperated with the head nurses and distributed the questionnaires among 190 participants who were willing to participate in the study. In total, 156 questionnaires were completed with the response rate of 82%. Data were collected using a questionnaire with two sections; the first section contained the demographic characteristics of the nurses (eight items), and the second section was the Hospital Survey on Patient Safety Culture (HSOPSC).

HSOPSC was developed by the Agency for Healthcare Research and Quality (AHRQ) in 2004. Validity and reliability of the questionnaire have been confirmed by Moghri et al. (2012) for the Iranian population. Moreover, the internal consistency of HSOPSC has been reported to be 0.85 (15).

HSOPSC consists of 42 items to measure 12 dimensions of the patient safety culture, including teamwork within units (four items), supervisor/manager expectations and promoting safety actions (four items), organizational learning-continuous improvement (two items), communication openness (three items), feedback and communication about errors (three items), teamwork across units (four items), staffing (four items), handoffs and transitions (four items), non-punitive response to errors (three items), management support for patient safety (three items), overall perceptions of safety (four items), and frequency of events reported (three items). All the items in the HSOPSC are scored based on a five-point Likert scale (Strongly Disagree-Never). In addition, HSOPSC contains two outcome questions

to determine the respondents' grading of the overall patient safety in their hospital and number of the events that they have reported within the past 12 months in their healthcare center.

Mean percentage of the positive responses was used to express the obtained results. Positive response was defined as the percentage of Strongly Agree/Agree (or Always/Most of the Time) responses for the direct-worded items and Strongly Disagree/Disagree (or Never/Rarely) responses for the reverse-worded items. Moreover, mean percentage of the positive responses for each level was defined as the mean percentage of the positive responses for the items of a dimension.

Final scores of HSOPSC were classified into three levels of high safety culture (positive response: >75%), average safety culture (positive response: 50-75%), and poor safety culture (positive response: <50%) (4). Data analysis was performed in SPSS version 16 (SPSS Inc, Chicago, IL, USA) using descriptive statistics (mean and frequency).

With respect to the ethical considerations, the objectives of the research were fully explained to the participants, and they were assured of confidentiality terms regarding their personal information and the name of their hospital.

Furthermore, written informed consent was obtained from all the participants prior to the study, and the questionnaires were kept anonymous by assigning codes. Study protocol was approved by the Ethics Committee of Isfahan University of Medical Sciences (No. IR.REC.1395.2.052).

Results

Out of 190 distributed questionnaires, 156 questionnaires were returned to the researcher by the respondents (response rate: 82%). Mean age of the participants was 34 ± 7.35 years, with the mean professional experience of 8.2 ± 5.36 years. All the participants were female (100%), the majority of whom were married (67.3%) and had a bachelor's degree in nursing (88.5%). Demographic characteristics of the participants are presented in Table 1.

With regard to the patient safety culture in the selected hospitals, the highest and lowest mean percentage of the positive responses belonged to the dimensions of 'teamwork within units' (98.5%) and 'handoffs and transitions' (15.3%), respectively. Mean percentage of the positive responses to all the dimensions of HSOPSC are shown in Table 2, and levels of these dimensions are presented in Table 3.

Table 1. Frequency Distribution of Demographic Characteristics

Demographic Characteristics		N (%)	Mean±SD
Marital Status	Single	50 (32.1)	
	Married	105 (67.3)	
	Divorced	1 (0.6)	
Education Level	Bachelor's Degree	138 (88.5)	
	Master's Degree	18 (11.5)	
Professional Experience (year)			8.2±5.36
Position	Nurse	148 (94.8)	
	Staff	4 (2.6)	
	Head Nurse	4 (2.6)	
Type of Working Shift	Fixed Morning Shift	20 (12.8)	
	Fixed Evening Shift	16 (10.3)	
	Fixed Night Shift	21 (13.5)	
	Rotational	99 (63.5)	
Patient Safety Training	Yes	120 (76.9)	
	No	36 (23.1)	

Table 2. Mean Percentage of Positive Responses in Dimensions of Patient Safety Culture

Dimension	Mean Positive Response (%)
Teamwork within Units	98.5
Supervisor/Manager Expectations and Actions to Promote Patient Safety	68.9
Organizational Learning-Continuous Improvement	87.8
Management Support for Patient Safety	67.5
Overall Perceptions of Safety	60.7
Feedback and Communication about Errors	80.3
Communication Openness	53.8
Frequency of Events Reported	78.8
Teamwork across Units	54.5
Staffing	37.1
Handoffs and Transitions	15.3
Non-Punitive Response to Error	21.5

Table 3. Levels of Patient Safety Culture Dimensions

Level	Dimensions
Poor	Non-Punitive Response to Error Handoffs and Transitions Staffing
Average	Supervisor/Manager Expectations and Actions to Promote Patient Safety Management Support for Patient Safety Overall Perceptions of Safety Teamwork across Units Communication Openness
High	Teamwork within Units Organizational Learning-Continuous Improvement Feedback and communication about errors Frequency of Events Reported

Overall, the mean positive response rate in the dimensions of HSOPSC was estimated at 61.3%, which indicated the average level of the patient safety culture in the NICUs of the studied hospitals. Frequency distribution of the nurses' responses to the item "Please give your work area/unit in this hospital an overall grade on patient safety." is presented in Table 4. In this regard, the majority of the participants (71.8%) rated the patient safety grade at their hospital as acceptable. With regard to the item on the number of the reported events within the past 12 months, 21.2% of the nurses had reported no events, 66.7% had reported 1-2 events, and 12.1% had reported 3-5 events.

Table 4. Frequency Distribution of Patient Safety Grades from Nurses' Perspective

Grade	N (%)
Excellent	9 (5.8)
Very Good	35 (22.4)
Acceptable	112 (71.8)
Poor	0 (0)
Failing	0 (0)

Discussion

The present study aimed to evaluate the perspective of nurses toward the patient safety culture in NICUs. According to the results, mean value of the patient safety culture in the NICUs of the selected hospitals was 61.3%, which indicated the average level of the patient safety culture. As such, the majority of the nurses rated the grade of the patient safety culture to be acceptable, and approximately 66.7% had reported 1-2 events within the past 12 months.

Consistent with the previous studies in this regard, the level of patient safety culture was considered to be high in the dimensions of 'teamwork within units' (16-18), 'organizational learning-continuous improvement' (19, 20), 'feedback and communication about errors' (19), and 'frequency of events reported' (16, 19).

According to the findings of the current

research, the highest score of HSOPSC belonged to the dimension of 'teamwork within units', which contained a set of items regarding the teamwork performance of the healthcare staff in emergency situations. Within the past 10-15 years, the care provision in ICUs has been increasingly oriented toward effective teamwork (21). The complex, stressful conditions in ICUs require collaborative approaches for the provision of high-quality services (22). Therefore, the patient safety culture in these units could be assured through the participation and commitment of all the members of the healthcare team (23).

In line with the results of some studies in this regard, the level of patient safety culture was determined to be average in the dimensions of 'management support for patient safety' and 'communication openness' (16), 'supervisor/manager expectations and actions to promote patient safety' and 'overall perceptions of patient safety' (19, 20), and 'teamwork across units'. On the other hand, Bahrami et al. (2014) evaluated the level of safety culture from the perspective of the nurses in Yazd (Iran), and the dimension of 'teamwork across units' was reported to be average (24).

Similar to the other studies in this regard, we observed the patient safety culture to be poor in the dimensions of 'handoffs and transitions' (1, 4), 'non-punitive response to errors' (4, 16), and 'staffing' (16, 17, 24). In contrast, Ballangrud et al. (2012) reported the level of safety culture to be high in the dimension of 'non-punitive response to errors' (19). This discrepancy could be due to the variable environments of healthcare centers in responding to mistakes and errors.

In the present study, the patient safety culture was found to be poor in the dimension of 'handoffs and transitions'. Patients admitted to ICUs are usually transferred to other wards in order to undergo the required procedures and receive the necessary examinations, which cannot be run at the patients' bedside; evidence suggests

that the transfer of these patients could risk their safety (25). The main purpose of handoffs and transitions is to convey and exchange the clinical information of patients to other individuals or healthcare providers at the time of transfer. Lack of continuity in the process of information exchange increases the risk of errors in the treatment procedures and may threaten the safety of patients. The most important causes of incidents during patient transfer are the insufficient number of healthcare staff, lack of knowledge, and inefficient communication (26).

In the current research, the dimension of 'staffing' was observed to have a low score, which reduces the level of patient safety. Inadequate number of competent staff is considered to be a major challenge in healthcare systems with an adverse effect on patient outcomes (27). Due to the shortage of workforce in healthcare centers, some employees may need to work more than the standard hours, which could lead to high stress levels, drowsiness, and possibility of committing medical errors (28). Therefore, healthcare managers should take the necessary measures for the accurate distribution of their workforce and adoption of proper approaches in this regard, such as transport, inter-sectoral and cross-sectoral handoffs, and providing transition checklists in order to prevent errors during patient transfer, handoffs, and transitions.

Based on the professional and ethical requirements, nurses must report their errors. Nevertheless, errors are not reported by these healthcare providers in many cases. In the study by Farzi et al. (2014), fear of the managers, matrons, and consequences of reporting errors were observed to be the main causes of error concealment (8). In the current research, the low score obtained in the dimension of 'non-punitive response to error' was indicative of poor patient safety despite the implementation of clinical governance and patient safety program for six years in the selected hospitals. Therefore, special attention must be paid to expanding the culture of non-punitive response to errors in order to assure the staff regarding the confidentiality of their names in the case of error reports, as well as the fact that error reporting would not affect their professional activities in the future.

Conclusion

According to the results, lack of adequate cooperation and coordination between various healthcare sectors and staff, as well as the insufficient number of healthcare employees, may

increase the rate of health risks in the neonates admitted in NICUs, especially in situations such as transportation, handoffs, and transfer of patients across hospital units. Therefore, healthcare centers are expected to facilitate teamwork processes through recruiting adequate staff and preparing handoff and transition checklists in order to prevent or minimize mistakes and errors. Furthermore, systemic use of incentive approaches in error reporting and dealing with errors could increase error reporting, thereby improving the patient safety culture in NICUs. Findings of the present study could lay the groundwork for designing measures to enhance patient safety and provide basic information for evaluating the effects of implementing such interventions.

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Conflicts of interest

The authors have no conflicts of interest to declare.

References

1. Profit J, Etchegaray J, Petersen LA, Sexton JB, Hysong SJ, Mei M, et al. Neonatal intensive care unit safety culture varies widely. *Arch Dis Child Fetal Neonatal Ed.* 2012; 97(2):F120-6.
2. Sexton JB, Sharek PJ, Thomas EJ, Gould JB, Nisbet CC, Amspoker AB, et al. Exposure to Leadership WalkRounds in neonatal intensive care units is associated with a better patient safety culture and less caregiver burnout. *BMJ Qual Saf.* 2014; 23(10):814-22.
3. Hamdan M. Measuring safety culture in Palestinian neonatal intensive care units using the Safety Attitudes Questionnaire. *J Crit Care.* 2013; 28(5):886.e7-14.
4. Arshadi BM, Jebreili M, Kargari RM. Patient safety culture assessment in neonatal intensive care units of Tabriz from the perspective of nurses in 2013. *Iran J Nurs Res.* 2015; 10(3):26-35.
5. Farzi S, Farzi S, Alimohammadi N, Moladoost A. Medication errors by the intensive care units' nurses and the Preventive Strategies. *Anesthesiol Pain.* 2015; 6(2):33-45.
6. Clancy CM, Farquhar MB, Sharp BA. Patient safety in nursing practice. *J Nurs Care Qual.* 2005; 20(3):193-7.
7. Profit J, Etchegaray J, Petersen LA, Sexton JB, Hysong SJ, Mei M, et al. The Safety Attitudes Questionnaire as a tool for benchmarking safety culture in the NICU. *Arch Dis Child Fetal Neonatal Ed.* 2012; 97(2):127-32.

8. Farzi S, Abedi H, Ghodosi A, Yazdannik AR. Nurses' experiences of medication errors. *J Qual Res Health Sci.* 2014; 2(4):310-9.
9. Mohebifar R, Alijanzade M. Studying patient safety culture from the viewpoint of staffs in educational hospitals in Tehran City. *J Health Safety Work.* 2015; 5(1):57-64 (Persian).
10. Salavati S, Fanoosi T, Dehghan D, Tabesh H. Nurses' perspectives on patient safety culture. *Iran J Nurs.* 2013; 26(84):24-33 (Persian).
11. Baghaee R, Nourani D, Khalkhali HR, Pirnejad H. Evaluation patient safety culture in personnel of academic hospitals in Urmia University of Medical Sciences in 2011. *J Urmia Nurs Midwifery Facul.* 2011; 10(2):155-64 (Persian).
12. Sharifi S, Izadi-tame A, Hatamipour KH, Sadeghigooghary N, Safabakhsh L. Patient safety culture from mazandaran clinical nurses' perspective. *Iran J Nurs.* 2014; 27(88):77-87 (Persian).
13. Jabari F, Ooshaksaraie M, Azadehdel M, Mehrabian F. Relationship between patient safety culture and professional conduct of nurses in context of clinical governance implementation. *J Holist Nurs Midwifery.* 2015; 25(3):27-33.
14. Timmel J, Kent PS, Holzmueller CG, Paine L, Schulick RD, Pronovost PJ. Impact of the Comprehensive Unit-based Safety Program (CUSP) on safety culture in a surgical inpatient unit. *Jt Comm J Qual Patient Saf.* 2010; 36(6):252-60.
15. Moghri J, Ghanbarnezhad A, Moghri M, Rahimi Forooshani A, Akbari Sari A, Arab M. Validation of Farsi version of hospital survey on patient Safety culture questionnaire, using confirmatory factor analysis method. *J Hospit.* 2012; 11(2):19-30 (Persian).
16. Tomazoni A, Rocha PK, de Souza S, Anders JC, de Malfussi HF. Patient safety culture at neonatal intensive care units: perspectives of the nursing and medical team. *Rev Lat Am Enfermagem.* 2014; 22(5):755-63.
17. Yaghobi FM, Takbiri A, Haghgoshaye E, Tabarraye Y. The survey of patient safety culture and recognizing its weaknesses and strengths in Sabzevar hospitals. *J Sabzevar Univ Med Sci.* 2011; 20(68):154-64 (Persian).
18. Mahfoozpour S, Ainy E, Mobasheri F, Faramarzi A. Patients' safety culture status among educational hospitals of Shahid Beheshti University of Medical Sciences in 2011. *Pajoohandeh J.* 2012; 17(3):134-41 (Persian).
19. Ballangrud R, Hedelin B, Hall-Lord ML. Nurses' perceptions of patient safety climate in intensive care units: a cross-sectional study. *Intensive Crit Care Nurs.* 2012; 28(6):344-54.
20. Chen IC, Li HH. Measuring patient safety culture in Taiwan using the Hospital Survey on Patient Safety Culture (HSOPSC). *BMC Health Serv Res.* 2010; 10:152.
21. Despina LA. Patient safety and collaboration of the intensive care unit team. *Crit Care Nurse.* 2009; 29(2):85-91.
22. Rose L. Interprofessional collaboration in the ICU: how to define? *Nurs Crit Care.* 2011; 16(1):5-10.
23. Sehgal NL, Fox M, Vidyarthi AR, Sharpe BA, Gearhart S, Bookwalter T, et al. A multidisciplinary teamwork training program: the Triad for Optimal Patient Safety (TOPS) experience. *J Gen Intern Med.* 2008; 23(12):2053-7.
24. Bahrami MA, Chalak M, Montazeralfaraj R, Dehghani Tafti A. Iranian nurses' perception of patient safety culture. *Iran Red Crescent Med J.* 2014; 16(4): e11894.
25. Esmail R, Banack D, Cummings C, Duffett-Martin J, Shultz J, Thurber T, et al. Is your patient ready for transport? Developing an ICU patient transport decision scorecard. *Healthc Q.* 2006; 9:80-6.
26. Habibzadeh F, Imanipour M, Mohammad Aliha J, Mehran A. Effect of applying checklist on quality of intra-hospital transport of intensive care patients. *Iran J Cardiovasc Nurs.* 2014; 3(3):30-7 (Persian).
27. Valentin A, Capuzzo M, Guidet B, Moreno RP, Dolanski L, Bauer P, et al. Patient safety in intensive care: results from the multinational Sentinel Events Evaluation (SEE) study. *Intensive Care Med.* 2006; 32(10):1591-8.
28. El-Jardali F, Dimassi H, Jamal D, Jaafar M, Hemadeh N. Predictors and outcomes of patients safety culture in hospitals. *BMC Health Serv Res.* 2011; 11(1):45.