Original Article

Patient Safety Culture in Intensive Care Units from the Perspective of Nurses: A Cross-Sectional Study

Abstract

Background: One of the goals of nursing is providing safe care, prevention of injury, and health promotion of patients. Patient safety in intensive care units is threatened for various reasons. This study aimed to survey patient safety culture from the perspective of nurses in intensive care units. **Materials and Methods:** This cross-sectional study was conducted in 2016. Sampling was done using the convenience method. The sample consisted of 367 nurses working in intensive care units of teaching hospitals affiliated to Isfahan University of Medical Sciences. Data collection was performed using a two-part questionnaire that included demographic and hospital survey on Patient Safety Culture (HSOPSC) questionnaire. Data analysis was done using descriptive statistics (mean and standard deviation). **Results:** Among the 12 dimensions of safety culture, the nurses assigned the highest score to "team work within units" (97.3%) and "Organizational learning-continuous improvement" (84%). They assigned the least score to "handoffs and transitions"(21.1%), "non-punitive response to errors" (24.7%), "Staffing" (35.6%), "Communication openness" (47.5%), and "Teamwork across units" (49.4%). **Conclusions:** The patient safety culture dimensions have low levels that require adequate attention and essential measures of health care centers including facilitating teamwork, providing adequate staff, and developing a checklist of handoffs and transitions. Furthermore, to increase reporting error and to promote a patient safety culture in intensive care units, some strategies should be adopted including a system-based approach to deal with the error.

Keywords: *Intensive Care Units, Iran, nurse, patient safery, safety culture*

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Introduction

Attention to patient safety first started with report of the Institute of Medicine (IOM) of errors in health care centers.[1] According to the World Health Organization statistic, one in every ten patients admitted to a health care centers suffers damage, including a wide range of errors or adverse events.[2] In intensive care units, due to the sensitive and complex situations, such as conditions of critically ill patients,[3] numerous incidents threaten patient safety. According to some studies from intensive care units in Iran, the prevalence of nosocomial infection (hospital-acquired infection) is 10.85%,[4] prevalence of pressure ulcers is 10.1–21%,[5] and the incidence of medication errors is 80%.[6] Care for patient safety has the purpose of ensuring proper care and achieving the best outcomes.[7] One of the essential steps to improve patient safety is patient safety culture.

Patient safety culture is a set of attitudes, opinions, and perceptions shared by employees in the field of patient safety.[1] In other words, safety culture is the result of individual and group values, attitudes, perceptions, competencies, and behavioral patterns that determine the commitment, style, and safety management skills of the organization.[8] Nurses are considered to be the most influential members of the health team in providing safe care and have an important role in care and patient safety.[9] Twenty-four hour nurse–patient relationship enables the nurses to provide the information necessary to identify the problems of the health system as a part of patient safety solutions. In a hospital, with a desirable safety culture, nurses should be able to express their opinions freely, and report cases where an adverse event is happening due to system problems or human factors.[10]

To achieve a positive safety culture, first, the current state of the organization's safety culture should be assessed because evaluation leads to identification of those

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dimensions of patient safety culture that need further attention, as well as enables managers to identify the strengths and weaknesses of safety culture.[11] The existence of an organization with an open and flexible culture leads to a systemic approach towards error, so that employees learn from mistakes and are not punished.[1]

In several studies, the relationship between patient safety culture and error reporting, reduction in adverse events, and lower mortality has been shown.[12] In health care centers where patient safety culture is lower than the standard, more errors occur.[13] In the study by Ballangrud *et al*. (2012), nurses reported safety status as positive, however, they considered improvements in the reporting, feedback and communication about errors, and organizational learning-continuous improvement to be essential.[14] In a study by Akbari *et al*. (2015), level of patient safety culture was reported to be low-to-moderate.[15] In some other studies,[9,16,17] safety culture points were reported to be low in some dimensions that require emergency intervention.

Health care centers should regularly assess and improve safety culture.[18] Moreover, to our knowledge, no studies evaluating the safety culture in the intensive care units of teaching hospitals in Isfahan were found. Considering these points and the importance of patient safety culture as an initial step to improve patient safety, the researchers attempted to study this issue from the perspective of the nurses who make up the bulk of the health team and are in direct contact with the patients. It is hoped that this study could be a useful and constructive step in improving patient safety and reducing errors in intensive care units.

Materials and Methods

This descriptive cross-sectional study was conducted between the months of June and July 2016 in intensive care units of nine educational hospitals affiliated to Isfahan University of Medical Sciences, Iran. Sampling was convenience. The sample size was calculated by $Z = 1.96$, $S = 16.7$, $N = 800$, and d = 1.5.

Data collection tool included a two-part questionnaire. The first section included demographic characteristics (8 questions). The second section was a 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 this questionnaire was measured by Moghri *et al*.[19] in Iran. Its internal reliability was reported to be 0.85. The HSOPSC consists of 42 items that measure 12 dimensions of safety culture including teamwork within units (4 items), supervisor/manager expectations and promoting safety actions (4 items), organizational learning – continuous improvement (2 items), communication openness (3 items), feedback and communication about error (3 items), teamwork across units (4 items), staffing (4 items),

handoffs and transitions (4 items) and nonpunitive response to errors (3 items), management support for patient safety (3 items), overall perceptions of safety (4 items), and frequency of events reporting (3 items). All items of the HSOPSC questionnaire were developed based on the five-point Likert response scale of "Strongly disagree" to "Never." The questionnaire also included two outcome questions that measured the respondents' grading of overall patient safety in their hospital and the number of events they had reported during the past 12 months. The average percent of positive responses was used for reporting of results. The positive responses for each item was defined as the percentage of strongly agree and agree (or always and most of the time) responses for direct-worded items and strongly disagree and disagree (or never and rarely) for reverse-worded items. In addition, the average percentage of positive responses for each level was defined as the mean of positive responses percent for that dimension's related items. The final score was classified into three levels – high-level safety culture (more than 75% of positive responses), medium-level safety culture (50-75% of positive responses) and low-level safety culture (less than 50% of positive responses). Data analysis was done using descriptive statistics (frequency distribution and mean) and version 16 of the SPSS software (Statistical Package for the Social Sciences software, version 16, SPSS Inc, Chicago, IL, USA).

The inclusion criteria were informed consent to participate in the research and having at least 3 months experience in the intensive care units. To complete the questionnaire, the researchers, after liaising with the head nurses, distributed questionnaires to the participants who gave their consent to participate in the study and met the inclusion criteria of the study. This study is a part of research project results 295 052 Number of the Isfahan University of Medical Sciences.

Ethical considerations

Ethical considerations were fulfilled by providing complete explanation regarding the purpose of the study and maintaining confidentiality of information. Written informed consent was obtained from all participants. The questionnaire was anonymous for confidentiality and a code was assigned to each questionnaire. Participants were assured that the study would not mention the name of the hospital and participants. The Ethics Committee of the Isfahan University of Medical Sciences endorsed this study (with approval No.IR.REC.1395.2.052).

Results

The majority of participants were female (83.7%), married (71.1%), and had bachelor of nursing degree (86.9%). Other demographic characteristics of the participants and their working conditions are presented in Table 1. The average percentages of positive responses of the 12 dimensions

of safety culture are presented in Table 2. According to the results, the level of safety culture in "teamwork within units" and "Organizational learning-continuous improvement" dimensions was high. The level of safety culture in "feedback and communication about error," "supervisor/manager expectations and promoting safety actions," "management support for patient safety," "frequency of events reporting," and "overall perceptions of safety" dimensions were medium. The level of safety culture in "handoffs and transitions," "non-punitive response to errors," "staffing," "communication openness," and "teamwork across units" dimensions were low. Overall, the mean positive response for the 12 patient safety culture dimensions was 57.7%, which indicated that the level of safety culture was medium.

Frequency distribution of nurses' responses to the question "Please give your work area/unit in this hospital an overall grade on patient safety" is presented in Table 3. The majority of nurses (59.7%) rated the patient safety grade of their hospital as "Acceptable." In response to the question regarding the number of error reporting in the last 12 months, 18% of the nurses reported no errors, 62.7% of the nurses reported 1–2 errors, 16.9% of the nurses reported 3–5 errors, 2.2% of the nurses reported 6–10 errors, and 0.3% of the nurses reported 11–20 errors.

Discussion

This study was conducted to investigate the patient safety culture in intensive care units of the educational hospitals of Isfahan. Mean patient safety culture was 57.7%, which is at the medium level. Most nurses rated the degree of patient safety culture at an acceptable level. Over the last 12 months, approximately 63% of nurses have reported 1–2 errors.

The level of safety culture in "Organizational learning-continuous improvement" was similar to the results of other studies,[1,14,20-23] and "teamwork within units" dimensions similar to previous studies[20,21,24,25] was high. In some studies, although none of these two dimensions were at a high level, the highest safety level from among 12 dimensions of safety culture belonged to these two dimension.[24,26,27] These two dimensions include questions regarding the quality of teamwork of the staff that help each other in emergency situations. The delivery of care in intensive care units demands more

Table 1: Frequency distribution of demographic characteristics

Demographic characteristics	Number (percent)	Mean (standard deviation)
Gender		
Female	307 (83.7)	
Male	60 (16.3)	
Age (year)		
-	-	36 (7.4)
Marital status		
Single	101 (27.5)	
Married	261 (71.1)	
Divorced	4 (1.1)	
Widowed	1 (0.3)	
Level of education		
BSc	319 (86.9)	
MSc	48 (13.1)	
Length of working as a nurse (year)		
-	-	9.3 (5.6)
Position		
Nurse	319 (86.9)	
Staff nurse	19 (5.1)	
Head nurse	29 (7.9)	
Shift types		
Morning shift only	54 (14.7)	
Evening shift only	29 (7.9)	
Night shift only	35 (9.5)	
Rotating three shifts	249 (67.8)	
Patient safety training		
Yes	298 (81.2)	
No	69 (18.8)	

Table 2: Mean percentage of positive responses for 12 dimensions of a safety culture

Dimension	Mean percentage of positive responses (percent)
Teamwork within units	97.3
Supervisor/manager expectations an promoting safety actions	69.7
Organizational learning – continuous improvement	84
Hospital management support for patient safety	62.3
Overall perceptions of safety	58.6
Feedback and communication about errors	70.6
Communication facilities	47.5
Frequency of event reporting	67.4
Teamwork between hospital units	49.4
Staffing	35.6
Hospital handoffs and transitions	21.1
Nonpunitive response to errors	24.7
Total Score of Patient Safety Culture	57.7

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Table 3: Frequency distribution of the grade on patient safety perspective of nurses

Grade	Number (percent)
Excellent	17 (4.6)
Very Good	120 (32.7)
Acceptable	219 (59.7)
Poor	5 (1.4)
Failing	6 (1.6)

team effort. The team includes physicians, nurses, physical therapists, nutritionists, social workers, and other skilled professionals. According to the situation and needs of the patient, variety and number of profession involved in the care is different.[28] Moreover, complex and stressful nature of intensive care units necessitate a team approach to care delivery that encourages effective interprofessional communication and collaboration.[29] Due to the nature of interprofessional care in the intensive care units, improving patient safety requires the participation and commitment of the health care team.[30] Similar to other studies, level of patient safety culture was at an medium level in the dimensions of "feedback and communication about error," "supervisor/manager expectations and promoting safety actions," " management support for patient safety," "frequency of events reporting,"[1,20,27] and "overall perceptions of safety."[1,14,20,27] Similar to other studies, level of patient safety culture was at a low level in the dimensions of "handoffs and transitions,"[1,23] "non-punitive response to errors,"[20,22,27] "staffing,"[20,22,25,26] "communication openness,"[22] and "teamwork across units."[1,14,25] In the study by Ballangrud *et al*. (2012), the level of safety culture in the dimension of "non-punitive response to errors" has been reported to be high.[14]

In the present study, the level of patient safety culture in "handoffs and transitions" has been assessed to be low. Transition of the patient from intensive care units to other units is done to carry out procedures and tests not possible at the patient's bedside and is of the cases that threaten patient safety.[31] The main purpose of handoffs of the patient is to transfer and share patient's clinical information at the time of transfer of responsibility to other health care provider. Lack of continuity of information raises the risk in the course of treatment and eventually patient safety. Insufficient number of staff, lack of knowledge, and fault in communication are the most important causes of accidents during transition of the patient.[32] In this study, the dimensions of "staffing" and "teamwork across units" are rated low, which can reduce the level of patient safety. The lack of a sufficient number of competent staff is of the challenges for health systems and evidence indicates its impact on health outcomes as well.[7] The shortage of staff in health care centers leads to more working of the employees than the standard level, so they experience more stress and insomnia that predispose to errors.[33] Therefore, managers should take adequate measures for proper

allocation and distribution of resources and use proper approaches, such as within unit and across unit checklist of handoffs and transition.

Although based on the professional and ethical requirements the nurses must report the errors afterwards, in many cases error reporting is not done. The atmosphere prevailing in health care centers should be such that nurses voluntarily self-report so that other nurses benefit from their experiences and prevent errors. One of the reasons for not reporting is the fear of its consequences,[34] which has been examined in the dimension of "non-punitive response to errors." Low level of safety in this dimension represents the institutionalization of nonpunitive response to error, confidence that employees hide their names, and to avoid any blame.

As the data collected is based on participants' self-report, it is possible that the participants did not have enough honesty in completing the questionnaire for fear of the consequences. This was minimized by anonymous questionnaires and explaining that the questionnaire was only available to researchers and the information is analyzed as general data that can control it.

Conclusion

Patient safety in intensive care units is threatened for insufficient collaboration and coordination between staffing in healthcare centers at the time of handoffs and transition. Therefore, health care centers should apply some measures including facilitating teamwork, providing adequate staff, and developing a checklist of handoffs and transitions. Furthermore, to increase reporting error and to promote a culture of patient safety a system-based approach to deal with the errors must be adopted.

Conflicts of interest

There are no conflicts of interest.

References

1. Cheni-Chi, Li H. Measuring patient safety culture in Taiwan using the Hospital Survey on Patient Safety Culture (HSOPSC). BMC Health Serv Res 2010;10:152.
2. [http://www.who.int/patientsafety/en/.[Last accessed on 2016 Oct 11].
3. Armitage G, Knapman H. Adverse events in drug adminstration: A literature review. J Nurs Manag 2008;11:130-40.
4. Ghorbani Birgani A, Asadpoor S. Nosocomial infections in intensive care unit of Ahvaz Arya Hospital (2008-2009). Modern Care 2011;8:86-93.

5. Afkar A, Mahboubi M, Mehrabian F, Farmanbar R, Ghahremani F, Kazemnejad E, *et al*. Factors predicting pressure ulcers in ICU using the Braden Scale. KUMS 2014;18:220-5.

6. Farzi S, Farzi S, Alimohammadi N, Moladoost A. Medication errors by the intensive care units' nurses and the Preventive Strategies. JAP 2015;6:33-45.

7. Valentin A, Capuzzo M, Guidet B, Moreno P, Dolanski L, Bauer P, *et al*. Patient safety in intensive care: Results from the multinational Sentinel Events Evaluation (SEE) study. Intensive Care Med 2006;32:1591-8.

8. Huang DT, Clermont G, Kong L, Weissfeld LA, Sexton JB, Rowan KM, *et al*. Intensive care unit safety culture and outcomes: A US multicenter study. Int J Qual Health Care 2010;22:151-61.

9. Sharifi S, Izadi-tame A, Hatamipour K, Sadeghigooghary N, Safabakhsh L. Patient Safety Culture from Mazandaran Clinical Nurses' Perspective. IJN 2014;27:77-87.

10. Jabari F, Ooshaksaraie M, Azadehdel M, Mehrabian F. Relationship between patient safety culture and professional conduct of nurses in context of clinical governance implementation. Holist Nurs Midwifery 2015;25:27-33.

11. Salavati S, Fanoosi T, Dehghan D, Tabesh H. Nurses' Perspectives on Patient Safety Culture. IJN 2013;26:24-33.

12. Weaver S, Lubomksi L, Wilson R, Pfoh E, Martinez K, Dy S. Promoting a Culture of Safety as a Patient Safety Strategy: A Systematic Review. Ann Intern Med 2013;158:369-74.

13. Baghaee R, Nourani D, Khalkhali H, Pirnejad H. Evaluation patient safety culture in personnel of academic hospitals in Urmia University of Medical Sciences in 2011. J Urmia Nurs Midwifery Fac 2011;10:155-64.

14. 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;28:344-54.

15. Akbary R, Zarei E, Gholami A, Mousavi H. A survey of patient safety culture: A Tool for Improving Patient Safety in Healthcare Providers Service Organizations. Iran Occup Health 2015;12:76-88.

16. Arshadi Bostanabad M, Jebreili M, Kargari Rezapour M. Patient safety culture assessment in neonatal intensive care units of Tabriz from the perspective of nurses in 2013. IJNR 2015;10:26-35.

17. Izadi AR, Drikvand J, Ebrazeh A. The Patient Safety Culture in Fatemeh Zahra Hospital of Najafabad, Iran. Health Info Manag 2013;9:895-907.

18. Timmel J, Kent S, Holzmueller G, Paine L, Schulick D, Pronovost J. Impact of the Comprehensive Unit-based Safety Program (CUSP) on safety culture in a surgical inpatient unit. Jt Comm J Qual Patient Saf 2010;36:252-60.

19. 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. Hosp Quart 2012;11:19-30.

20. Yaghobi Far MA, Takbiri A, Haghgoshaye E, Tabarraye Y. The Survey Of Patient Safety Culture And Recognizing Its Weknesses And Strenths In Sabzevar Hospitals. JSUMS 2011;20:154-64.

21. 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;17:134-41.

22. Faghihzadeh S, Motamed N, Shoghli AR, Asuri M, Safaian Amoli M. Assessment of Nurse Viewpoints on Patient Safety Culture in Amol Hospitals in Iran, 2012. Prev Care Nurs Midwifery J (PCNM) 2014-2015:4:45-55.

23. Mohebi Far R, Alijan zade M, Safari Variani A, Khoshtarkib H, Ghanati E, Teymouri F, *et al*. Studying patient safety culture from the viewpoint of staffs in educational hospitals in Tehran City. J Health Saf Work 2015;5:57-64.

24. Moghri J, Akbari Sari A, Rahimi Forooshani A, Arab M. Patient Safety Culture Status in General Hospitals Affiliated to Tehran University of Medical Sciences. Hakim Res J 2013;16:243-50.

25. Dehghani M, Hayavie Haghighi M, Salimi J, Khorami F. Culture of Patient Safety from Nurses' Perspective. Iran J Nurs 2015;28:42-54.

26. Bahrami MA, Chalak M, Montazeralfaraj R, Tafti A. D. Iranian nurses' perception of patient safety culture. Iran Red Crescent Med J 2014;16:e11894.

27. Afshari A, Piruzi M, Afshari S, Hejab K. Patient safety culture assessment in Seidolshohada hospital of Semirom. Medical Surgical Nursing. Iran J Nurs Res 2016;11:1-8.

28. Despins LA. Patient safety and collaboration of the intensive care unit team. Crit Care Nurs 2009;29:85-91.

29. Rose L. Interprofessional collaboration in the ICU: How to define?. Nurs Crit Care 2011;16:5-10.

30. Sehgal NL, Fox M, Vidyarthi AR, Sharpe BA, Gearhart S, Bookwalter T, Wachter RM. A multidisciplinary teamwork training program: The Triad for Optimal Patient Safety (TOPS) experience. J Gen Intern Med 2008;23:2053-7.

31. 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. Healthcare Quart 2006;9:80-6.

32. Habibzadeh F, Imanipour M, Mohammad Aliha J, Mehran A. Effect of applying checklist on quality of intra-hospital transport of intensive care patients. Cardiovasc Nurs J 2014;3:30-7.

33. El-Jardali F, Dimassi H, Jamal D, Jaafar M, Hemadeh N. Predictors and outcomes of patient safety culture in hospitals. BMC Health Serv Res 2011;11:1-12.

34. Farzi S, Abedi H, Ghodosi A, Yazdannik AR. Nurses' Experiences of Medication Errors. J Qual Res Health Sci 2014;2:310-9.