

# The Effect of Individual and Organizational Variables on Patients' Safety Culture (PSC): A Case Study on Nurses

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## A-R-T-I-C-L-E-I-N-F-O

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## A-B-S-T-R-A-C-T

**Background & Aims of the Study:** The purpose of the hospital accreditation program is to improve the patients' safety. Prevention of mistakes in medical procedures, patients' safety risk identification and infection prevention besides the patients' safety culture (PSC) are the key factors that must be considered in a successful patients' safety program. This study aimed to assess PSC and its association with demographic factors among nurses of a hospital in Qom, Iran.

**Materials & Methods:** This research as a descriptive-analytical and cross-sectional study on the effect of individual and organizational variables on patients' safety culture among nurses was conducted in 2015. The final sample included 106 employees from one of the hospitals located in Qom province of Iran. The questionnaires consisted demographic questions and a valid questionnaire about patients' safety culture. T-test, ANOVA and Pearson correlation were conducted to analyze the data by SPSS V20.

**Results:** The age of nurses was  $35.15 \pm 10.33$  (Mean $\pm$ SD) years. Results showed that the patients' safety climate score among nurses was  $70.15 \pm 7.23$ . In addition, there are significant differences between groups of work shift and also education levels in the viewpoints of patients' safety ( $p < 0.05$ ); but, other variables were not different ( $P > 0.05$ ).

**Conclusions:** Although, based on our finding, considered hospital had a suitable situation of patients' safety culture, but it is important to pay attention to continuous improvement in the scope of health care workers and patient safety to achieve critical mission and visions of organizing. Job selection on the basis of demographic considerations and implementation of an accreditation plan for health care systems are two examples of how occupational safety and health tools can be used to provide quality improvement information for health care organizations such as hospitals.

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## Background

Patient safety is one of the most important components of healthcare quality (1,2). Therefore, it has founded a good position in the health sector in recent decades and founded a significant importance among both developed

and developing countries (2). Patient safety includes evaluating of risks, recognizing and managing dangers associated with patients, the report of incident analysis, learning capacity and following incidents up and finally the implementation of some solutions in order to minimize the risk of recurrence of incidents.

Undoubtedly, various factors affect patients' safety in healthcare centers (3). One of the effective factors on the safety of patients is the safety climate of the organization (4). Safety climate that is considered as the workers' perceptions of safety influences of their motivation towards the occupational safety behavior (4). Effective safety management in 21<sup>st</sup> century is due to considering human factors as a component of a system with a potential to create either dangerous or safe condition in other components. Regarding human factors, organizations with high reliability can recognize risks prior to happening. To that end, assessing safety total mood is similar to the safety climate or safety culture which has named leading factor (5).

From the viewpoint of sociology, culture is a pattern including values, beliefs, customs and traditions, knowledge, language, ideology, perception, attitudes and the lifestyle of people in a society (6). In other words, culture is a set of common concrete and subjective patterns among people belonging to a group, level or a community which is formed by social acts of people. After formation; however, culture goes beyond the limitation and affect the creation of such acts. Therefore, actors (people) using these to experience, describe, interpret and evaluate not only the world but also their and that of others' social life. These set of common subjective and concrete patterns are continually remade and reinterpreted during the acts of actors; so between them, patterns change with the time.

Safety culture is the result of values, attitudes, perceptions, competencies and individual or group behavioral patterns whereby the degree of workers' compliance with the style of health and safety management of the organization is determined (6). In fact, safety culture is a small part of organizational culture (7).

Safety culture is a combination of workers (safety climate), safety behavior and safety management of organization (7). Safety culture refers to the aspects of organizational culture

that affect the attitudes or behaviors causing a decrease or an increase in risks (8). Referring to these concepts, the term "Safety climate" for the first time was coined out of the name of a researcher called Zohar (8). In some texts; however, it is deemed to be the same as 'safety culture' and therefore is used interchangeably. It can be considered, nevertheless, in a different meaning. In this regard, psychological aspects and the attitudes of people are regarded as the safety climate; an approach that say people's view about safety and the performance of managers of the organization and also covers the total attitude and perception of them toward the safety requirements of the organization (8). In fact, safety climate is the outward layer of safety culture (6,8).

Safety climate assessment can be used to recognize those factors that require further attention and then improvement. Safety climate is an important factor since provides a good context for developing people's attitude and promoting safety behaviors (9). Generally, safety climate supposed to act like a frame of reference directing behaviors (10). It is a component of the safety culture (11). In several studies which were conducted by Flynn et al, factors of management/monitoring, safety system, dangers, workload and competence are determined as the prevalent dimensions of safety climate (4). It was defined that safety climate can be related with employees' perceptions of the role of fate in the happening of incidents (12). Nurses have a great contribution in medical errors because they are the main persons who look after the patients and are in charge of many care activities. Therefore to examine nurses' attitudes and their perceptions of safety has a great impact on the evaluation and the degree of safety climate. Safety culture of patient is listed as one of the significant indicators in reducing incidents. Meanwhile, this indicator is considered as a duty and task for any workers in the organization. It is widely accepted that safety

climate is an effective factor on patients' safety (1).

**Aims of the study:**

This study has been designed and conducted with the aim of assessing the patients' safety culture and its relationship with demographic features among nurses.

**Materials & Methods**

The present study is a descriptive-analytical and cross-sectional research that conducted in 2015 among nurses of a hospital in Qom province of Iran who were selected through simple randomized sampling. In addition, there were no criteria for exclusion and inclusion. Target samples according to the score range of two questionnaires used in this study was 200 people.

$$n = \frac{Z_{1-\alpha/2}^2 S^2}{d^2} = 200,$$

in which:  $\alpha = 0.05, S = (R/6) = 13, d = 1.8.$

To collect personal information, the researcher made a demographic questionnaire including (age, marital status, education, work experience, gender and the number of training courses in relation to safety or work). Patients' safety culture was assessed by a questionnaire made by Mortazavi et al. (1). This questionnaire contains 20 questions; each question has 5 Likert choices (5- completely agree 4- agree 3-no comment 2- disagree 1- completely disagree) with a Cronbach' alpha equal to 87% which has an acceptable reliability (1). The obtained scores of this questionnaire are in range of 20-100 and the higher score indicates a stronger safety culture. Finally, data were analyzed, using T-test, ANOVA and Pearson correlation coefficient at a significant level of 0.05 on SPSS version 20.

**Results**

From 200 distributed questionnaires among nurses, 106 of them were reliable and the rate of responses was about 0.53. Examining personal and professional features of

respondents reveal that 42.5% of respondents were men and 57.5% were women. In addition, about 75.5% of respondents were married. Most of nurses had a bachelor's degree or master degree (about 66%), while 12.3% had associate degree and about 21.7% had diploma. The range of their age was between 19 to 60 years old. Nurses' work experience was 1-35 years. Table 1 shows the distribution of demographic variables.

**Table 1) The distribution of demographic features (n=106)**

variable		frequency	percentage
<b>Gender</b>	Male	45	42.5
	Female	61	57.5
<b>Marital status</b>	Married	79	74.5
	Single	27	25.5
<b>Education level</b>	Diploma		
	Associate diploma	23	21.7
	Bachelor degree and higher	13	12.3
<b>Work system</b>	shift	70	66
	Workday	91	85.5
		15	14.2

In addition, the most training periods were 5 times over work years. Among participants, those who never trained during their work period were about 23%.

In order to examine the reliability of patients' safety culture, Cronbach's alpha questionnaire was used and calculated 0.87. Table 2 shows the description of demographic parameters.

**Table 2) Description of quantitative demographic parameters**

Demographic parameter	Min.	Max.	Mean	Standard deviation
<b>age</b>	19	60	35.15	10.33
<b>Professional background</b>	1	35	11.41	10.77
<b>Education</b>	0	5	1.15	1.43
<b>Patient safety culture</b>	50	96	70.15	7.23

The differences of patients' safety culture between two groups of women and men were examined by T-test; the results didn't show any significant difference ( $P > 0.05$ ) between these two groups. Men, however, from a quantitative point of view with a mean and standard deviation ( $70.29 \pm 8.37$ ) have a better condition than women ( $70.05 \pm 6.34$ ). According to table

3, the results of t-test indicate that there is no significant difference for patients' safety culture between two groups of married and single nurses ( $P>0.05$ ).

Meanwhile, patients' safety culture between two groups of 'shift' and 'work day' is different as well as among nurses with different education level; but in fact, this difference is significant statistically ( $P<0.05$ ).

**Table 3) A comparison of patient safety culture among different groups**

	*Gender		*Marital status		*Work system		**Education
	male	female	married	single	shift	Work day	
<b>M±SD</b>	70.29±8.37	70.05±6/34	69.91±7.54	70.58±6.35	69.55±7.44	73.80±4.51	70.05±0.812
<b>Sig</b>	0.87		0.56		0.04		0.03

\* Analyzed by t-test/ \*\* analyzed by ANOVA

**Table 4) Pearson correlation coefficient (p) and the level of significant relation of variables with patient safety culture**

Patient safety culture	P <sub>valu</sub> Sig.	age	Professional background	The numbers of training courses
		0.146	0.150	0.001
	0.128	0.118	0.996	

## Discussion

Nurses commit avast range of medical errors, because they play the main role in treatment of patients and they have direct interaction with them. Thus, identifying their perceptions and attitudes toward patients' safety and also incidents is important in measuring the safety culture of a healthcare organization. In this regard, this study has focused on patients' safety culture in one of the hospitals of Qom province, Iran. Several studies indicated that, there was a significant relation between safety culture perception and clinical results (13). Meanwhile, findings revealed that the reliability of questionnaire of safety culture comparing to 0.7, a favorite rate for reliability, (14) is desirable. The mean score of patients' safety culture among nurses (70.15) was more than the possible mean of the related tools (60); i.e. patients' safety culture is in an acceptable status. In a study by Baghai et al on patients' safety culture in Uromia, Iran, it was reported that most of nurses have an acceptable status (15) in contrary to other studies that reported the safety culture which was unacceptable (16).

One-way variance test was used to analyze the differences among educational groups. Pearson correlation test revealed that there was no significant relation between quantitative demographic variables and patient safety culture ( $P>0.05$ ). Table 4 shows the result.

Findings revealed that shift nurses have better understanding of patients' safety, perhaps it is because of their presence in hospitals at different hours; therefore, having more interaction with different patients make them more sensitive to this issue. In addition, nurses with higher education degree have better patients' safety than others with lower degrees. This shows a direct relation between nurses' education level and their understanding of safety conditions. Also, results clarified that work experience is not in associate with patients' safety culture. Pervious researches showed a significant relation between PSC and work experience (17). Also, the result is against with the findings of Vifladi et al. (18) there was no significant statistical relation with work experience. It was not confirmed in a study conducted by Izadi et al as well (3). Gender was not associated with PSC as the same as outcome of past study (18). Although patients' safety culture is in an acceptable status, it is often considered as an indicator for determining patients' safety because changes in it like an increase in medical errors can lead to heavy and severe results and affect the patients' safety directly. Sub-factors of patients' safety culture

can be different among various groups of healthcare personals (19). So, it can be considered in the future.

## Conclusion

Paying attention to the principles of continuous improvements toward promoting the safety of personnel and patients is crucial in reaching the major objectives of organization. Paying attention to the training of personnel is the most important point as the findings of the study showed that nurses' knowledge has a positive effect on their understanding of patients' safety. But this is while more than half of nurses have not passed safety training. Therefore, planning a safety education program must be a high priority. Managers and decision-makers should eliminate the fear of blame among the personnel and it should be noted that promoting the culture and reaching to a higher level is a time-consuming process.

## Footnotes

### Conflict of Interest:

The authors declared no conflict of interest.

## References

1. Mortazavi SB, Oostakhan M, Mofidi A, Babaei A. The impact of patient safety climate on medical errors in a sample of nurses: creating safer health care. *J Health Scope* 2012;(4):158-164.
2. 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 Hospital* 2012;11(2):19-30.(Full Text in Persian)
3. Izadi AR, Drikvand J, Ebrazezh A. The patient safety culture in FatemeZahra hospital of Najafabad, Iran. *Health Inform Manag* 2015;9(6):895-907. (Full Text in Persian)
4. Kudo Y, Kido S, Shahzad MT, Saegusa Y, Satouh 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):70-79.
5. Attwood DA, Deeb JM, Danz-Reece ME. *Ergonomic solutions for the process industries*. USA; Elsevier; 2004.

6. Davies F, Spencer R, Dooley K. *Summary guide to safety climate tools*. UK: Health Safety Executive; 2001.
7. Cooper D. *Improving safety culture: A practical guide*. UK: John Wiley & Sons Ltd; 2001.
8. Yule S. *Safety culture and safety climate: A review of the literature*. [PhD Thesis].Industrial Psychology Research Centre.UK: University of Aberdeen. 2003.
9. Zohar D, Luria G. The use of supervisory practices as leverage to improve safety behavior: a cross-level intervention model. *J Safety Res* 2003;34(5):567-77.
10. Khandan M. *Survey relationship between safety climate and ergonomic behavior of workers at the workplace*. [MSc Thesis]. Social Welfare and Rehabilitation Sciences, 2010.
11. Health foundation. *Measuring safety culture tools: Health foundation evidence scans; Identify Innovate Demonstrate Encourage*; 2011. Available from: [http://www.health.org.uk/sites/default/files/Measuring\\_SafetyCulture.pdf](http://www.health.org.uk/sites/default/files/Measuring_SafetyCulture.pdf).
12. Kiani F, Khodabakhsh MR. The Relationship between safety climate with fatalism and perceived helplessness among workers: Implication for health promotion. *J Commun Health Res* 2013;2(3):196-207. (Full Text in Persian)
13. Bonner AF, Castle NG, Men A, Handler SM. Certified nursing assistants' perceptions of nursing home patient safety culture: is there a relationship to clinical outcomes? *J Am Med Dir Assoc* 2009;10(1):11-20.
14. Stanton N, Hedge A, Brookhuis K, Salas E, Hendrick H. *Handbook of human factors and ergonomics methods USA*: CRC press; 2005. P. 633.
15. Baghaee R, Nourani D, Khalkhali H, Pirnejad H. Evaluating patient safety culture in personnel of academic hospitals in Urmia University of medical sciences in 2011. *J Nurs Midwif* 2012;10(2):155-164.(Full Text in Persian)
16. Tabibi J, Nasiripour A, Maleki M, Raessi P, Mahmmoudi M, Azimi L. Survey of employees' safety attitude in a teaching hospital Tehran 2010. *Iran Occup Health J* 2011;7(4):25-31.(Full Text in Persian)
17. 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* 2013;16(3):243-50. (Full Text in Persian)
18. Vifladt A, Simonsenc B, Lydersend S, Farup P G. Changes in patient safety culture after restructuring of intensive care units: Two cross-sectional studies. *Intensive Crit Care Nurs* 2016;32:58-65.
19. Chakravarty BA, SahuMA, Biswas BM, Chatterjee SCK, Rath S.A study of assessment of patient safety climate in tertiary care hospitals. *Med JArm Forces India* 2015;71(2):152-7.