

## Studying the Relationship between Individual and Organizational Factors and Nurses' Perception of Patient Safety Culture

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### ABSTRACT

**Introduction:** Safety culture is considered as an important factor in improving patient safety. Therefore, identifying individual and organizational factors affecting safety culture is crucial. This study was carried out to determine individual and organizational factors associated with nurses' perception of patient safety culture. **Methods:** The present descriptive study included 940 nurses working in four training hospitals affiliated with Urmia University of Medical Sciences (Iran). Data was collected through the self-report questionnaire of patient safety culture. Descriptive (number, percent, mean, and standard deviation) and inferential (t-test and analysis of variance) statistics were used to analyze the data in SPSS. **Results:** Nurses' perception of patient safety culture was significantly correlated with marital status, workplace, and overtime hours. **Conclusion:** The results of this study revealed that some individual and organizational factors can impact on nurses' perception of patient safety culture. Nursing authorities should thus pay more attention to factors which promote patient safety culture and ultimately the safety of provided services.

## Introduction

In 1999, the Institute of Medicine in the United States published a report on the prevalence of medical errors in the country.<sup>1</sup> As a result, researchers and health experts started to consider patient safety. Following similar reports by institutions in other countries such as England, Canada, and Australia, health care systems throughout the world realized that they are not safe enough.<sup>2</sup>

As a core component of health quality services, patient safety means to avoid and prevent any injury to the patient during health care provision.<sup>3</sup> The issues that threaten patient safety include medication errors (wrong type or dosage of the prescribed drug), inappropriate surgical procedures (performing surgery on the wrong parts, using the wrong techniques, or postoperative complications), improper diagnosis (delayed

or wrong diagnosis or not diagnosing), equipment failure that may lead to misdiagnosis, and other issues such as nosocomial infections, patient falls, bedsores, and wrong treatment.<sup>4</sup> Unsafe services not only impose unpleasant consequences on patients and their families, but also pose psychological pressure on health system staff and the society as a whole. Health care systems and communities would thus encounter a huge economic burden.<sup>4</sup> According to available evidence, it is estimated that 1 out of every 10 patients in developed countries is injured while receiving hospital services. Although there is no exact statistics about medical errors in developing countries, increasing numbers of public complaints from doctors and nurses to medical and forensic organizations in these countries<sup>5</sup> imply their higher rates of damage to patients compared to developed countries.<sup>6</sup>

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One of the factors that can affect patient safety in health organizations is patient safety culture.<sup>7</sup> Culture is the set of beliefs and values of a group of people that is manifested in their behaviors.<sup>8</sup> In fact, patient safety culture represents the importance of patient safety in the workplace as considered by the staff.<sup>9</sup> In a vastly accepted definition, the Health and Safety Commission of England defined safety culture as producing individual and group values, attitudes, understandings, competence, and behavioral patterns that determine the commitment, style, skills, and safety and health management of an organization.<sup>10</sup> Accordingly, providing and maintaining patient safety culture are multifaceted and require the consideration of all relevant aspects. The US Agency for Healthcare Research and Quality (AHRQ) has categorized the factors affecting patient safety into 7 groups of organizational and treatment factors, workplace-related factors, group factors, factors related to duties and roles, personal characteristics of the service provider, personal characteristics of the patient, and environmental factors.<sup>4</sup> Therefore, identifying organizational and individual factors of patient safety and how they can interact with each other has an important role in health programs and improving patient safety. Factors such as exhaustion, excessive workload, lack of motivation, and poor interpersonal relations can negatively affect levels of safety and quality in an organization. On the other hand, effective interpersonal relations, group work, appropriate management and supporting systems, and adequate personnel and time to provide patients with care can facilitate patient safety culture promotion. The AHRQ has stated that the tendency of nurses to report mistakes is an indication of strong safety culture within care provision organizations.<sup>11</sup>

As first service providers in hospitals, nurses have a key role in forming the safety culture. Therefore, their understanding of

workplace safety would help hospital managers and officials in evaluating programs to promote patient safety culture. Determining perceptions of nurses about patient safety culture is also extremely important since it can result in identifying factors threatening patient safety and estimating the preparation and participation of nurses in promoting patient safety and providing high quality care as the final product.

Providing patient safety, as a core component of quality health services, has always been an important challenge for health systems in all countries. Therefore, many efforts have recently been dedicated to promoting it. Although extensive research on patient safety has been performed in developed countries,<sup>12</sup> searching valid research databases with "culture" and "patient safety" as keywords reveals that few studies have evaluated factors influencing patient safety culture. In general, research has indicated poor safety conditions in taking care of patients.<sup>13</sup> In recent years, few Iranian studies have assessed some specific aspects of patient safety in health centers. Instances of these studies are Valizadeh *et al.*,<sup>14</sup> Zahmatkeshan *et al.*,<sup>15</sup> Baghcheghi and Koohestani<sup>16</sup> on medication errors. In addition, Amiresmaili *et al.* measured safety culture in an Iranian hospital and reported inadequacy in most aspects.<sup>17</sup> Therefore, Iranian health researchers have a good opportunity to investigate aspects of patient safety including factors affecting patient safety culture. On the other hand, due to the increasing number of medical errors, knowledge about patient safety culture and its associated factors is of great importance in modifying the culture to match it with scientific care developments.

Identifying individual and organizational factors that affect patient safety is the beginning of creating safety culture in an organization. In fact, moving towards providing safe care without adequate knowledge about influencing factors might increase costs and expose the organization to

new hazards. On the other hand, in 2009, the Iranian Ministry of Health and Medical Education necessitated the implementation of clinical governance in the country's care system. Since risk management is one of the pillars of clinical governance and an important principal to eliminate improper, weak, and inefficient care, studies in this field seem to be absolutely essential.

Despite the importance of patient safety culture and its associated factors, limited Iranian studies are available in this field. Therefore, the present study was conducted to assess the relationship between individual and organizational factors and understanding of patient about patient safety culture in training hospitals affiliated with Urmia University of Medical Sciences (Iran) in the year 2011.

## Materials and methods

This descriptive, correlational study was conducted in 4 training hospitals affiliated with Urmia University of Medical Sciences in 2011. Based on initial assessments ( $p < 0.17$  and  $\alpha = 0.05$ ) and the number of available nurses in the mentioned health centers ( $n = 1131$ ), the sample size was estimated at 900 participants. However, since some of the personnel were not accessible during data collection (due to paid leave, sick leave, or other reasons), all 1131 nurses were considered as the study population. Subjects with an associate degree or higher degree in nursing who were working in the mentioned hospitals at the time of study were included.

The Hospital Survey on Patient Safety Culture (HSOPSC), designed by the Agency of Healthcare Research and Quality (AHRQ) in 2004, was used to evaluate the status of patient safety culture. Considering that the original questionnaire was in English, it was first translated into Farsi. Afterwards, 2 faculty members, who were familiar with both languages, controlled the compatibility of the translation with the source and made the necessary corrections. After distributing the translated version of HSOPSC among 10

faculty members, content validity was assessed and minor changes were applied in the questions. Internal reliability of the questionnaire was confirmed by calculating Cronbach's alpha as 0.61-0.81 (AHRQ reported the values as 0.63-0.84).<sup>18</sup>

HSOPSC consists of 2 sections. The first section includes demographic information (age, sex, marital status, and education) and organizational specifications (the hospital and unit of work, nursing experience, employment duration in the current hospital, monthly hours of work, and type of patient care). The second section consists of 44 items to assess 12 aspects of patient safety culture and 2 aspects of consequences of developing patient safety culture (hospital's score of patient safety and the amount of reported errors). The aspects of patient safety culture included manager or supervisor expectations of promoting safety, continuous improvement of organizational learning, teamwork, explicit communications, informing the employees about the errors and giving them feedback, non-punitive response to errors, medical staff and their issues, hospital management support for patient safety, teamwork between hospital units, shift changes in hospital, reports of errors and mistakes, and overall understanding of safety. They were measured by a 5-point Likert scale ranging from "strongly agree" to "strongly disagree". According to the standard scoring of the questionnaire, "agree" and "strongly agree" were positively scored, "no comment" was scored as zero, and "disagree" and "strongly disagree" had negative scores. A few questions were in the reverse form and thus the scoring was also reversed. Moreover, for each aspect, only the average scores of positive responses were considered. Aspects with scores greater than 75%, 50-75%, and less than 50% were evaluated as desirable, promotable, and undesirable, respectively. The number of errors and reported incidents during the last year (from 0 cases to 20 and more) were assessed using a senary range. In order to determine patient safety score of each hospital, staff members were asked to

categorize their hospital performance as excellent, very good, acceptable, poor, or reject.

After obtaining approvals from the Ethics Committee and Research Council of Tabriz University of Medical Sciences and consents from the participants, the questionnaires were distributed and filled out anonymously. Questionnaires with the same answer to all items or those with many unanswered items (> 50%) were excluded.<sup>19</sup> Finally, 940 completed questionnaires were collected (response rate: 83%).

Quantitative data was analyzed using descriptive statistics (number, percent, mean, and standard deviation). Independent t-test was used to determine the relations between qualitative variables of the two groups and patient safety culture. Relationships between more than two groups and patient safety culture were evaluated using analysis of variance (ANOVA). All analyses were performed in SPSS<sub>13</sub> (SPSS Inc, Chicago, IL, USA) at a significance level of 5%.

## Results

Studying the demographic characteristics of the participants showed that 770 of the nurses were female (85.6%), 469 were married (72.1%) and 313 (42.7%) aged 30-39 years old (Table 1). According to the organizational details of the nurses, 363 participants were working in intensive care units (38.8%), about half (49.3%) had less than 80 hours overtime, most of them (94.6%) had a bachelor's degree, and 404 (43%) were the personnel of one of the healthcare centers under study (Table 2). The highest and lowest numbers of positive responses were given to the hospital unit level and outcome variables, respectively (Table 3).

There were significant relations between mean positive responses of nurses and their marital status, type of workplace, and overtime hours (Table 4).

**Table 1.** Demographic characteristics of participating nurses

Variable	Groups	Frequency (%)
Sex	Female	770 (85.6)
	Male	130 (14.4)
Marital Status	Single	251 (27.9)
	Married	649 (72.1)
Age	21-29 years old	262 (35.7)
	30-39 years old	313 (42.7)
	40-49 years old	148 (15.7)
	50-59 years old	10 (1.1)

According to t-test, married nurses gave more positive responses compared to single participants ( $t = -2.21$ ;  $df = 890$ ;  $p < 0.02$ ). Moreover, nurses with less than 80 hours overtime had higher mean positive scores compared to those with more than 80 hours overtime ( $p < 0.001$ ). In addition, mean positive scores of nurses working in the only specialized hospital was significantly higher than those in other hospitals ( $p < 0.05$ ) (Table 5). Other demographical and organizational characteristics were not significantly correlated with positive scores ( $p > 0.05$ ).

## Discussion

The present study aimed to determine the relationship between individual and organizational factors and understanding of nurses about patient safety culture. Our results suggested significant relations between marital status of nurses and their understanding of patient safety culture. Similar findings were also obtained by Abdou and Sabe who evaluated 156 nurses in Alexandria University Hospital, Egypt.<sup>20</sup> In contrast, in a Turkish study on 185 doctors, nurses, midwives and other healthcare staff members, Bodur and Filiz could not establish a relation between marital status and the understanding of the subjects about patient safety culture.<sup>21</sup> This inconsistency might have been caused by difference in the studied populations (we and Egyptians evaluated

**Table 2.** Organizational characteristics of participating nurses

Variable	Groups	Frequency (%)	
Working area/unit	Many different hospital units/No specific unit	3 (0.3)	
	Medical (non-surgical) unit	132 (14.1)	
	Surgery	127 (13.6)	
	Obstetrics	16 (1.7)	
	Pediatrics	42 (4.5)	
	Emergency department	92 (9.8)	
	Intensive care unit (any type)	363 (38.8)	
Working hours per month	Other	161 (17.1)	
	Part time	9 (1.0)	
	Charged duty	248 (28.7)	
	80 hours or less overtime	442 (49.3)	
Education	81-175 hours overtime	137 (15.3)	
	More than 175 hours overtime	60 (6.7)	
	Master's degree	48 (5.2)	
Interaction or contact with patients	Bachelor's degree	876 (94.6)	
	Associate degree	2 (0.2)	
Hospital	Direct	905 (96.3)	
	Indirect	35 (3.7)	
Work experience	Imam Khomeini	404 (43.0)	
	Shahid Motahari	185 (19.7)	
	Taleghani	195 (20.7)	
	Seyed-Al-Shohada	156 (16.6)	
Work experience	Less than 1 year	137 (15.2)	
	1-5 years	428 (47.3)	
	6-10 Years	164 (18.1)	
	11-15 years	67 (7.4)	
	16-20 years	82 (9.1)	
	21 years or more	26 (2.9)	
	With the hospital	With the work area	In profession
	234 (25.9)	460 (50.9)	76 (8.4)
	460 (50.9)	287 (31.9)	253 (28.1)
	128 (14.2)	32 (3.5)	108 (12.0)
	67 (7.4)	30 (3.3)	106 (11.8)
	82 (9.1)	19 (2.1)	70 (7.8)
	26 (2.9)		

**Table 3.** Mean positive responses of nurses to levels of patient safety culture in Urmia training hospitals

Safety culture levels	Score	Positive response	95% confidence interval
Unit level (7 dimensions)	58.90 (0.51)	932 (58.82)	58.87-58.93
Hospital level (3 dimensions)	55.05 (0.88)	919 (54.95)	54.99-55.11
Outcome variable (2 dimensions)	52.90 (0.83)	926 (52.27)	52.85-52.95
Overall perceptions of patient safety	56.90 (0.54)	932 (55.34)	53.43-60.37

Values are expressed as mean (SD) or n (%).

**Table 4.** The relationships between demographic factors and mean positive responses of participating nurses

Variable	Groups	Scores	Positive response	Statistical parameters
Marital Status	Single	54.85 (15.81)	251 (27.90)	t = -2.21; df = 890; p = 0.027
	Married	57.57 (16.74)	649 (72.10)	
Working Hours Per Month	Part time	55.82 (15.48)	9 (1.00)	F = 5.170 df = 4 p < 0.001
	Charged duty	60.43 (16.67)	248 (28.70)	
	Less than 81 hrs overtime	56.62 (16.16)	442 (49.30)	
	81-175 hrs overtime	54.07 (14.76)	137 (15.30)	
Hospital	More than 175 hrs overtime	52.37 (18.43)	60 (6.70)	F = 11.497 df = 3 p < 0.001
	Imam Khomeini	54.75 (15.66)	404 (43.00)	
	Shahid Motahari	56.86 (17.11)	185 (19.70)	
	Taleghani	55.85 (16.53)	195 (20.70)	
	Seyed-Al-Shohada	63.67 (16.89)	156 (16.60)	

Values are expressed as mean (SD) or n (%)

**Table 5.** Patient safety culture status among Urmia training hospitals

Hospital	Patient safety culture		
	> 75%	50-75%	< 50%
Imam Khomeini	55	15	30
Shahid Motahari	58	11	31
Taleghani	57	14	29
Seyed-AI-Shohada	76	23	11

nurses while the Turkish researchers included all health workers).

We could not establish any significant relations between sex or age and scores of perception of patient safety culture. However, Abdou and Sabe reported the highest mean positive scores of nurses' perception of patient safety culture among married participants who aged 40 years old or more, did not have children, and had 11 years of working experience.<sup>20</sup> In the US, Holden *et al.* studied 213 healthcare personnel in 4 outpatient health centers and found a significant relation between age and mean positive scores of patient safety culture. They suggested individuals over 42 years of age to obtain the highest scores.<sup>22</sup> The differences between the results of this study and previous research could be due to factors such as different classifications of age, limited studies, and not mentioning the number of children. Unfortunately, after searching "patient safety" in valid databases, no report on the relation between nurses' sex and their perception of patient safety culture was found.

Considering the organizational specifications, there was a significant inverse relation between mean positive scores of nurses' perception of patient safety culture and monthly working hours. Moreover, nurses in specialized hospitals had higher mean scores compared to those in general hospitals. Bodur and Filiz failed to find a relation between working hours and mean positive scores of participants' perception of patient safety culture.<sup>21</sup> Other research however, reported a significant relation between the two variables. For instance, Rogers *et al.* evaluated 162 nurses in the US

and reported 12 hours of continuous working or working more than 40 hours a week to be associated with increased medical errors.<sup>23</sup> In our study, none of the participants worked more than 12 hours a day since it was banned in Iran in 2011.

We did not detect significant relations between mean positive scores of participants' perception of patient safety culture and other organizational factors such as unit type, educational level, type of patient health care (direct or indirect), and work experience. In the US, Singer *et al.* studied 1836 doctors and nurses in 92 hospitals and observed significant differences in safety culture conditions between various units of hospitals. They concluded that emergency units had the lowest mean scores of safety culture.<sup>24</sup> Lack of consistent results from different studies in this field can be due to small sample sizes, limiting the study area to training centers, and differences in health care policies.

## Conclusion

In summary, our findings indicated relations between individual (marital status) and organizational factors (overtime work and hospitals) and patient safety culture in training hospitals of Urmia. Poor patient safety culture was observed in the only specialized hospital. Identifying the affecting factors on patient safety culture not only clarifies the strengths and weaknesses for the managers and nurses, but also has the ability to improve the situation. Therefore, improving and developing safety culture should be a priority for organizational managers of health services. Due to restrictions on internal studies on patient safety culture factors, further research is recommended. According to the findings, we suggest the following solutions for improving patient safety culture:

1. Full implementation of efficiency rule in order to respect the planned working hours by the nurses;

2. Using experienced and qualified personnel in all shifts;

3. Integrating training courses about patient safety in in-service training programs for the personnel;

4. Introducing the concept of patient safety culture in the initial trainings of the personnel;

5. Including courses about patient safety in curriculum of university students.

Some of the most important limitations of this study that restrict the use of our results were limiting the study population to nurses, considering educational health centers, and small number of participants with various individual and organizational characteristics (such as male nurses, indirect healthcare service nurses, nurses with education levels higher or lower than bachelor's degree). Further studies to assess all effective people in all kinds of hospitals are thus recommended.

### Ethical issues

None to be declared.

### Conflict of interest

The authors declare no conflict of interest in this study.

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