Research Paper:

Evaluation of the Patient Safety Culture Status and its Related Factors From the Perspective of Operating Room Personnel

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ABSTRACT

Background: Patient safety is one of the principles of health care and evaluation of the patient safety culture motivates to provide safe conditions for patient care. Regarding the invasive procedures and the necessity of special attention to patient safety in the operating room, this study aimed to determine the patient safety culture from the perspective of operating room personnel.

Methods: This research was a descriptive cross-sectional study. The study sample consisted of 206 operating room personnel of Mazandaran educational hospitals who were selected by stratified random sampling. Data collection was performed using the patient safety culture questionnaire and a demographic form. The obtained data were analyzed by descriptive and inferential statistics (Pearson correlation test, one-way ANOVA, independent t-test, and Chi-square test) in SPSS V. 20. The significance level was set at less than 0.05.

Results: Most of the operating room personnel (72.3%) rated the patient safety culture as moderate. Among the dimensions of patient safety culture, "non-punitive response to error" was not favorable (7.4±2) and the dimensions of the "frequency of error reporting" (11.5±2.2), "overall perceptions of patient safety" (15.1±2.4), and "teamwork within units" (15.4±2.9) were rated as favorable. Among the studied variables, there was a significant relationship between occupational groups and safety culture (P=0.04).

Conclusion: Patient safety culture status was moderate from the perspective of most operating room personnel. Considering the greater sensitivity of safety in the operating room, hospital managers should adopt suitable approaches and policies to promote the patient safety culture.

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Highlights

- Patient safety is considered as an inherent component of healthcare quality.
- The main requirement to improve patient safety is to promote patient safety culture.
- Nowadays despite the significant progress of medical science, there are still a lot of unintended harms that threaten patients all around the world.
- The nature of the operating room requires a different approach to patient safety, as various invasive procedures are performed in this room.

Plain Language Summary

Unsafe culture of healthcare employees is a major issue for healthcare providers in promoting the quality of care which is closely correlated with the occurrence of hospital errors and incidents. The operating room is one of the main units in the hospital, where the most important phase of patient treatment is performed. This study was designed to determine the status of patient safety culture and its related factors from the perspective of operating room personnel. According to the results, the average safety culture was not ideal in the operating room personnel.

1. Introduction

Nowadays one of the human concerns in the field of health care is the maintenance of patient safety in medical centers. But despite the efforts of many health care organizations, huge errors still happen with significant financial and human costs (Psaty & Burke 2006). Patient safety from the perspective of the World Health Organization is avoidance and removal of unexpected or potentially health-relevant damages (Emami Razavi et al., 2011).

Using approaches to improve patient safety is one of the key practices that have been the focus of health care organizations in the early 21st century. Improving patient safety is a common international priority, as many errors are currently occurring worldwide in the care and treatment of patients (Milligan 2007; Matsubara, Hagihara & Nobutom 2008). Some of these errors are medication errors (errors in the type or dose of the drug), surgeries (surgery on an incorrect part, using the wrong technique, postoperative complications), inappropriate diagnoses (delay in diagnosis, non-diagnosis, incorrect diagnosis), nosocomial infections, patient falls, bedsores, and incorrect treatment (Abdi, Maleki & Khosravi 2012). In developed countries, 10% of patients receiving health care, encounter medical errors, while this is much higher in developing countries (Izadi, Jahangir & Ebrazeh 2013).

A study in Canada found that between 7.5% and 12.7% of hospitalized patients have been exposed to medical errors (Baker et al., 2004). There is no record of medical errors in Iran, but the Ministry of Health and Medical Education has reported that millions of dollars are spent each year on patient care in hospitals due to medical errors (Niknejad et al., 2019). Health care organizations have been working to promote and improve the quality of services and paying increasing attention to patient safety (Mousavi et al., 2017). One of the most widely regarded aspects of patient safety is its culture (Bodur & Filiz 2010; Chen & Li 2010). Various studies have reported that the most important obstacle on the way of improving patient safety is the safety culture of health care organizations and have stated that constructive safety culture is the key to patient safety improvement (Castle & Sonon 2006; Zwart et al., 2011). Therefore, to improve patient safety in such centers, it is necessary to maintain a robust patient safety culture among personnel along with structural interventions (Smits et al., 2008). In other words, in healthcare organizations, improving the patient safety culture and transitioning from a culture that believes no error or harm will be changed to a culture that encourages reporting-even reporting errors in which the patient has not been injured-can play an important role in preventing errors and improving service quality (Wilson 2007).

Evaluation of the safety culture of organizations leads to a brighter view of those dimensions of patient safety that need more attention and allows hospitals to identify the strengths and weaknesses of their safety culture

and patient safety issues (El-Jardali et al., 2010). Mahfooz pour et al. considered as moderate level the status of patient safety culture in training hospitals affiliated to Shahid Beheshti University of Medical Sciences (Mahfoozpour et al., 2012). Also, Abdi in his study reported the status of cultural dimensions of patient safety as undesirable (Abdi, Maleki & Khosravi 2012). One of the hospital departments which is recognized according to its organizational, educational, environmental and technological needs as the most high-risk areas of a health center is the operating room ward (Christian et al., 2006).

Statistics have shown that most accidents and injuries occur in the operating room and emergency departments; thus it is necessary to pay more attention to the reduction of the risk of medical errors in such places (Khalooei, Mehdipour, Rabori & Nakhaee 2013). Thus the importance of patient safety in the operating room and the key role of operating room personnel in maintaining patient safety and adverse consequences of inattention to patient safety is clear. However, studies on safety culture status in operating room wards are very limited. Therefore, this study was carried out to determine the status of patient safety culture and its related factors in operating rooms from the perspective of its personnel.

2. Materials and Methods

This research is a descriptive cross-sectional study to determine the status of patient safety culture and its related factors from the perspective of operating room personnel of the Hospitals affiliated with Mazandaran University of Medical Sciences (Imam Khomeini, Fatemeh Zahra, Zare, Bu Ali Sina & Razi). The study population consisted of operating room personnel (surgical technologists and anesthesia technicians). The study was carried out for 6 months from February to July 2019. Giving informed consent, and having at least 6 months of experience in the operating room were the inclusion criteria and those who did not have the consent to participate in the study were excluded.

A total of 206 subjects were selected using a stratified random sampling method. Each of the 5 selected hospitals in this study was considered as a stratum and the samples were selected randomly according to the number of subjects in each stratum. Data were collected using the hospital survey on patient safety culture questionnaire. This questionnaire was designed by the US Agency for Health Care Quality Research in 2004 (Almasi et al., 2015) and contains 42 items which evaluate staff perceptions of the patient safety culture in 12 dimensions (frequency of error reporting, overall perceptions of patient safety, supervisor/manager expectations and actions promoting safety, organizational learning-continuous improvement, teamwork within units, communication openness, feedback and communication about the error, non-punitive response to error, staffing, hospital management support for patient safety, teamwork across hospital units, and hospital handoffs and transitions) on a 5-point Likert scale from "completely disagree" to "strongly agree". Each of the areas of the frequency of error reporting, organizational learning-continuous improvement, communication openness, feedback and communication about the error, non-punitive response to error, and hospital management support for patient safety has three questions and scores between 3 and 15. Weak level refers to scores less than 7.5; moderate level to scores from7.5 to less than 11.25, and favorable level to scores more than 11.25. Each of the areas of overall perceptions of patient safety, supervisor/manager expectations and actions promoting safety, teamwork within units, staffing, teamwork across hospital units, and hospital handoffs and transitions has 4 questions and scores from 4 to 20. Weak level refers to scores less than 10; moderate level to scores from 10 to less than 15, and favorable level to scores more than 15. Total patient safety culture scores ranges from 42 to 210 (weak level=scores less than 98, moderate level=99 to 154, and favorable level=above 155). The validity and reliability of the Persian version of this questionnaire have been confirmed in Iran (Moghri et al. 2012). In the present study, the reliability of the questionnaire was evaluated again using the Cronbach alpha coefficient which was 0.81.

The questionnaires were distributed among the participants without mentioning the name in the study and the participants were assured of the confidentiality of their information. The obtained data entered into SPSS V. 20 and were analyzed using descriptive statistics, the Pearson correlation test, One-way ANOVA, independent t-test, and Chi-square test.

3. Results

A total of 206 personnel of the operating rooms of the educational hospitals of Mazandaran University of Medical Sciences participated in the study. The results showed that most of the participants were female (55.3%), married (81.1%), officially employed (37.9%), and with a bachelor's degree (78.2%). The Mean±SD age of the participants was 33.4±6.9 years and their experience in the operating room was 10±7.1 years. Other demographic characteristics are presented in Table 1.

The Mean±SD score of the total patient safety culture of the participants was 143.9±18.2, which is classified as moderate (99-154). Table 2 presents the relationship between the safety culture score and the studied variables. Among

Table 1. Frequency distribution of the participants according to demographic characteristics

Characteristics	Variables	No. (%)
Occupational groups	Surgical technologist	110 (53.4)
	Anesthesia technician	96 (46.6)
Gender	Male	92 (44.7)
	Female	114 (55.3)
Marital status	Single	39 (18.9)
	Married	167 (81.1)
Education level	Associate degree	36 (17.5)
	BSc. degree	161 (78.2)
	MSc. degree	9 (4.4)
Employment Status	Official	78 (37.9)
	Contractual	60 (29.1)
	Bespoke	32 (15.5)
	Project	36 (17.5)

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the variables, there was a significant relationship between occupational groups and safety culture (P=0.04), so that the safety culture scores in anesthesia personnel were more than surgical technologists. Based on the findings of Table 2, the mean score of safety culture according to the employment status of the participants showed a significant difference (P=0.01), so that the employees with official employment had the highest score on safety culture (Table 2).

Table 2. Relationship between safety culture and study variables

Variables		Mean±SD	P
Occupational groups	Surgical technologist	141.5±17.5	0.04
	Anesthesia technician	146.6±18.7	
Gender	Male	142.2±16.8	0.64
	Female	143.8±16.3	
Marital status	Single	141.7±16.1	0.40
	Married	144.7±18.7	
Employment Status	Official	148.3±21.1	0.019
	Contractual	141.6±13.3	
	Bespoke	137.3±19	
	Project	143.8±16	

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Table 3. Frequency distribution of the level of safety culture from the participants' perspective

PSC Level *	No. (%)
Weak (42-98)	3 (1.5)
Moderate (99-154)	149 (72.3)
Favorable (155-210)	54 (26.2)
Total	206 (100)

* Patient safety culture

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Table 4. Mean and level of patient safety culture dimensions from the perspective of operating room staff

Dimensions	Mean±SD / Level	Surgical-Technologists	Anesthetists	P
Frequency of error reporting	11.5±2.2 Favorable	11.3±2.2	11.6±2.2	0.349
Overall perceptions of patient safety	15.1±2.4 Favorable	14.8±2.5	115.4±2.3	0.067
Supervisor/manager expectations and actions promoting safety	14.5±3.1 Moderate	14.2±3	14.8±3.2	0.157
Organizational learning-continuous improvement	10.9±2.1 Moderate	10.6±2	11.2±2.2	0.063
Teamwork within units	15.4±2.9 Favorable	15.2±2.9	15.6±2.8	0.281
Communication openness	9.4±2.1 Moderate	9.2±2.2	9.6±2	0.205
Feedback and communication about error	10.6±2.1 Moderate	10.4±2	10.7±2.3	0.266
Non-punitive response to error	7.4±2 Weak	7.2±2	7.7±2.1	0.138
Staffing	11.2±2.6 Moderate	11.2±2.7	11.3±2.6	0.951
Hospital management support for patient safety	10.2±2.7 Moderate	9.9±2.7	10.7±2.7	0.047
Teamwork across hospital units	9.9±2.2 Moderate	9.7±2.1	10.2±2.7	0.119
Hospital handoffs and transitions	17.6±3.3 Moderate	17.5±3.4	17.8±3.3	0.605

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The findings indicated that participants' work experience had a significant influence on the safety culture (r=0.346, P=0.001). It means that by increasing work experience, perception of safety culture also improves.

The results showed that most of the operating room personnel (72.3%) participating in this study rated the level of patient safety culture as moderate (Table 3).

According to Table 4, a significant difference exists between surgical technologists and anesthesia personnel only in the area of "hospital management support for patient

safety" (P=0.047). Table 4 presents the participants' perceptions of the status of each dimension of patient safety culture at three levels of favorable, moderate, and weak.

4. Discussion

The results of this study showed that the level of patient safety culture was moderate from the perspective of operating room personnel. It was also shown that among the 12 dimensions of patient safety culture, "frequency of error reporting", "overall perceptions of patient safety", and "teamwork within units" were favorable. The results of a study in Turkey (Bodur & Filiz 2010) showed that the "frequency of error reporting" among the other dimensions had the lowest mean, which is inconsistent with the findings of the present study. Another study evaluated the "frequency of error reporting" status as unsuitable and weak, which is also inconsistent with the present study (Mohebi Far et al., 2015). Error reporting is considered as one of the indicators of patient safety and it can reduce serious consequences at both practical and ethical levels and using information obtained from error reporting can help in managing existing errors and preventing future mistakes (Koohestani & Baghcheghi 2009).

El-Jardali in his study evaluated the highest score of safety culture in the two dimensions of "teamwork within the units" and "organizational learning-continuous improvement", which is consistent with our study in the first dimension (El-Jardali et al., 2010). Some researchers mentioned "teamwork within the units" as a strength of the safety culture which is in line with our study (Abdi, Maleki & Khosravi 2012; Salavati et al., 2013; Ebadi Fard azar et al., 2011). Functional results of teamwork include reducing the duration of hospitalization, decreasing the likelihood of patient readmission, increasing the power of communication and collaboration between physicians and other personnel, and also reducing the incidence of medical errors. Achieving patient safety depends on teamwork (Buljac-Samardzic et al., 2020). In the present study, "non-punitive response to error" was introduced as the main weakness of safety culture in operating room wards. This dimension has also been reported in the lowest levels of safety culture in other studies (Rockville et al., 2014; Bodur & Filiz 2010; Ravaghi et al., 2012; Tabrizchi & Sedaghat 2012; Yaghoobifar et al., 2012). Punishment and blame for errors will cause concealment, non-sharing errors, and failure to learn from the mistakes that occur and the probable occurrence of more errors. The American Medical Association has recommended that organizations should discard this culture that errors and mistakes arise from personal incompetence and consider the errors as opportunities for learning (El-Jardali et al., 2010).

In the present study, the work experience of the participants had a significant impact on the perception of safety culture. In other words, with more work experience, the safety culture score also increases. This finding is consistent with the results of some studies (Agharahimi et al., 2012; Mahfoozpour et al., 2012). However, the results of some other studies indicated that with increasing work experience, safety culture decreases, which is inconsistent with the results of our study (Moghri et al., 2012; Izadi, Jahangir & Ebrazeh 2013). In the present study, there was a significant relationship between the score of patient safety culture from the perspective of the specialties, which was consistent with some other studies (Saber et al., 2015; Jahangiri et al., 2017). The difference between the results of other studies and ours may be due to the differences between operating room features, operating room workloads, and specialized structures of various sections. According to the results of this study, the score of patient safety culture in anesthesia technicians was higher than that of the surgical technologists. As a result, it seems that surgical technologists need more interventions to improve patient safety programs.

The limitation of this study was collecting information through self-administered questionnaires which increase subjectivity and bias in data collection.

This study revealed that patient safety culture status did not seem to be favorable from the perspective of operating room personnel. Patient safety is more sensitive in the operating room due to the nature of working in such units. Therefore, changing and enhancing the safety culture of all operating rooms is the most important issue that should be considered. Measures such as educational need assessment and using it for conducting courses and workshops and re-training in the field of patient safety and improving the motivation system (encouragement and punishment) are suggested for promoting the perception of operating room personnel of its safety culture.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethical Research Committee of Mazandaran University of Medical Sciences (IR.MAZUMS.REC.1398.372). Informed consent was received from all participants. The data were collected anonymously and the participants were assured of the confidentiality of their information.

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Authors' contributions

Analyzing data, drafting the manuscript, study design: Omid Zadi Akhuleh, Ehsan Memarbashi; Collecting data: Omid Zadi Akhuleh, Ehsan Memarbashi, Fatemeh Imani; : Supervision: All authors.

Conflict of interest

The authors declared no conflicts of interest.

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