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Understanding the Relationship Between Care Quality Perception and Patient Safety Culture

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Abstract:

Background: Assessing the perceived quality of care and safety culture by nurses is an important part of nursing practice and is vital for improving the quality of nursing care.

Aim: This study was conducted to investigate the relationship between perceived quality of care and patient safety culture.

Methods: A cross-sectional study was conducted using stratified and convenience sampling techniques from March 2023 to January 2024 among 412 nurses working in hospitals at Mashhad University of Medical Sciences, Iran. The data collection tools were standard care behavior questionnaires (CBI-42) and the Hospital Survey on Patient Safety Culture (HSOPSC). The data were analyzed using descriptive and inferential statistical tests at a significance level of 0.05.

Results: The perceived quality of care among nurses was high, with a score of 4.79 (1-6). The highest score was in "knowledge and professional skill" (5.03), while "communication and positive attitude" scored the lowest (4.59). Patient safety culture averaged 3.35 (1-5), with "overall perception of patient safety" at 4.82 and "non-punitive response to error" at 2.40. A significant direct relationship was found between perceived quality of care and patient safety culture ($r=0.226$, $p<0.001$), indicating that improvements in one may enhance the other.

Conclusion: Due to the existence of a direct relationship between perceived quality of care and patient safety culture, appropriate training and using the experiences of others, improving the relationship between nurses and patients, creating a sense of security in nurses, and solving the problems of nurses can enhance the quality of health care services.

Keywords: Nursing care, Caring behavior, Perceived quality of care, Patient safety culture, Quality of care.

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1. INTRODUCTION

Safety while delivering health care to patients is one of the main components of the quality of health care services. Patient safety involves taking all possible precautions to prevent harm and injury while providing health care [1-3]. These injuries have a wide scope, which can include things such as performing surgery at the wrong site, using the wrong techniques, complications after surgery, misdiagnoses, hospital infections, the patient falling from the bed, and bedsores [4]. The significant occurrence of clinical risks and safety incidents leads to severe shortcomings in patient safety and quality of care [5]. One of the factors introduced by experts in the field of patient safety in order to improve the level of safety in healthcare centers is to create a culture of patient safety in these centers [6]. Culture refers to a set of beliefs, ideas and group values of people, which is manifested in their behavior and the culture of patient safety can be considered the first priority and common value in healthcare organizations, which continuously seek to minimize the harm caused by the process of providing care to the patient [7]. In any health system, hospitals play an important role in providing care, diagnosis and treatment services, and safety is one of the main concerns of health systems [4]. Nurses constitute a significant portion of the healthcare system's workforce and have extensive interaction with patients throughout the day and night. This causes the activities of nurses to be very effective in the output and outcome of healthcare systems [8]. The role of nurses in safeguarding patient safety is vital, as they are responsible for monitoring clinical deterioration, identifying errors, and grasping care processes and system weaknesses to ensure the delivery of quality care [9]. Although numerous organizations and health institutions prioritize the concept of care in philosophy as their vision and mission, nursing care in the healthcare system remains a complex concept that lacks a clear and precise definition [10]. Caring behavior and evaluation of the quality of care is based on the knowledge, attitude and skills of nurses [11]. Care in nursing is a multi-dimensional concept [12] and is a main criterion in the policies of the health system, and nursing education programs are constantly being reviewed so that education is developed more toward more care-oriented programs [13]. One of the valid theories about professional nursing care is Watson's theory of human care. This theoretician has expanded the concept of care by considering all its scientific, human and experimental dimensions [14]. The quality of care and patient satisfaction are heavily influenced by the nurse-patient relationship [15]. It is imperative for healthcare organizations to prioritize effective, safe, and patient-centered services [16]. Few studies have been conducted regarding the relationship between perceived quality of care and patient safety culture among nurses, but the results of related studies (Hajibabaee [17], Sheikhy-Chaman [18], Kim [19], Granel-Giménez [20], Karaca [9]) show that appropriate care behaviors improve the quality of care, increase the feeling of security in patients, reduce anxiety, and create a good relationship between the nurse and the patient. Improving the quality of care and patient safety is the main priority of healthcare reforms, and despite the studies, these two categories require improvement in healthcare systems [21]. Evaluating the perceived quality of care among nurses in relation to their caring behaviors and patient safety culture offers an opportunity to implement necessary changes in nursing practices and enhance the overall quality of nursing services [9]. The purpose of this study is to determine the relationship between perceived care quality and patient safety culture among nurses working in hospitals of Mashhad, one of the big and major cities of Iran.

2. METHODS AND MATERIALS

2.1. Study Design and Setting

The cross-sectional study was conducted from March 2023 to January 2024. The STROBE guidelines for observational studies were consulted during the design and reporting of this cross-sectional study [22]. The study setting was hospitals affiliated with Mashhad University of Medical Sciences (MUMS). MUMS is among the top three largest medical universities in Iran, with over 8300 students and 900 faculty members, 30 hospitals, and 20 health and treatment networks, which serve a total population of more than 5 million people [23].

2.2. Study Population and Sample

The study population included all the Nurses working in the affiliated Hospitals of Mashhad University of Medical Sciences in Iran (2,907 people). Nurses with a minimum of 12 months of direct nursing experience in the emergency, Internal medicine, Surgery, and intensive care departments have participated.

2.3. Sample Size Determination

In order to determine the minimum sample size, taking into account a small effect size of 0.05, the type 1 error of 0.05, and the power of the test of 0.90, the sample size was estimated to be 390 using the linear regression menu in G-power 3.1.5 software. The output of the software was as follows:

F tests - Linear multiple regression: Fixed model, R^2 deviation from zero

Analysis: A priori: Compute required sample size

Input: Effect size $f^2 = 0.05$

α err prob = 0.05

Power (1-β err prob) = 0.9

Number of predictors = 8

Output: Noncentrality parameter λ = 19.5000000

Critical F = 1.9627193

Numerator df = 8

Denominator df = 381

Total sample size = 390

Actual power = 0.9004712

By considering 20% attrition (response rate 85%), the final sample size was determined to be 488 nurses.

2.4. Sampling Technique and Procedures

In this study, the stratified sampling method was used in two strata. The first stratum was hospitals and the second stratum was departments of surgery, internal medicine, emergency, and intensive care. Convenience samples were taken from each stratum according to the size of the strata.

2.5. Study Tools

Demographic and professional information forms for participants, as well as questionnaires on the Caring Behaviors Inventory and patient safety culture, were used as tools for data collection.

2.6. Demographic Information Form

The questionnaire of demographic and professional information includes the items of age, gender, marital status, level of education, type of hospital, type of department, the total number of years of work experience, and type of employment.

2.7. Caring Behaviors Inventory (CBI)

A care behavior questionnaire was used to measure the perceived quality of care [9]. This section includes 42 questions in 5 dimensions, which include respecting others, ensuring human presence, communication and positive attitude, professional knowledge and skills, and attention to other experiences. This questionnaire is scored on a six-point Likert scale and its scoring is as follows: (never = 1, rarely = 2, sometimes = 3, usually = 4, often = 5, always = 6). In the mentioned tool, a higher score indicates more appropriate care behaviors (low 1-3.5, medium 3.5-4.75, high 4.75-6). The reliability and validity of this questionnaire have been confirmed by Wolfe *et al*. [24], as the Cronbach's alpha of this questionnaire was reported as 0.93. In Iran, this questionnaire has been used in two studies by Rafiei *et al*. [25] and Hajinejad *et al*. [26], and its Cronbach's alpha was 0.98 and 0.85, respectively.

2.8. Patient Safety Culture (HSOPSC)

This section has 42 questions that measure the state of patient safety culture from different dimensions. The response range is a five-point Likert type (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree). Twelve dimensions of patient safety culture include Frequency of reporting events, Overall perception of patient safety, expectations and management actions in line with patient safety, organizational learning, teamwork within organizational units, openness of communication channels, communication and providing feedback on errors, non-punitive response to error, staff issues, management support for patient safety, teamwork between organizational units and exchange and transfer of information. In the mentioned tool, a higher score indicates a higher understanding of patient safety culture (low 1-3, medium 3-4, high 4-5). The HSOPSC, which is the original U.S. English version from 2010, underwent development and testing by the Agency for Healthcare Research and Quality in 2004. The Cronbach's coefficient alpha was used to estimate the internal consistency reliability of the original English version, yielding a range of 0.63 to 0.84 [27]. The Hospital Survey of Patients Safety Culture (HSOPSC) in Persian was utilized for our study. This version was specifically adapted for the Iranian healthcare system by Moghri *et al*. [28]. In the study of Kakemam *et al*., Cronbach's alpha coefficient values ranged from 0.76 to 0.82 [29].

2.9. Data Collection

After obtaining the necessary permits and coordination with the nursing managers of the hospitals, the researcher determined the hospital's off-peak hours when patients' families typically visit. Then, they verbally stated the background, content and purpose of the research to the nurses, and after obtaining informed consent, nurses who were willing to participate in the research were asked to complete the online questionnaire through Google Docs.

2.10. Data Analysis

The level of patient safety culture and perceived quality of care in nurses was analyzed using descriptive statistics. The normality distribution of the quantitative variables was evaluated using the Shapiro-Wilk test. We used the Mann-Whitney U test and the Kruskal-Wallis test to compare patient safety culture scores between groups defined by two-level and more than two-level categorical variables, respectively. The relationship between patient safety culture and continuous variables was analyzed using Spearman correlation. A multiple linear regression model was used to investigate the relationship between patient safety culture and perceived quality of care while controlling the effect of variables such as hospital type and education. Data was analyzed using SPSSV26 software. The significant level was considered 0.05.

2.11. Ethics Approval and Consent to Participate

This study was conducted based on the declaration of ethical principles of Helsinki and the good clinical practices at the site were approved by the Mashhad University of Medical Sciences with the code of ethics. After explaining the objectives of the research, the method of conducting the research and the content of the questionnaire, informed consent was obtained from the participants. Verbal consent was obtained from the study participants because the data were collected by using an online questionnaire and thus did not involve any human data. The Ethics Committee approved the use of verbal consent. Confidentiality and privacy were assured for all study participants. All methods were carried out in accordance with relevant guidelines and regulations under ethics approval and consent to participants (IR.MUMS.FHMPM.REC.1402.082).

3. RESULTS

A total of 412 study participants completed and returned the questionnaires, yielding a response rate of

76% (412/543). Descriptive results showed that the mean age of study samples was 36 ± 7 and the mean work experience was 13 ± 7. Other general characteristics of the respondents are shown in (Table 1).

Table 1. General characteristics of nurses (N = 412).

Characteristics	Categories	Frequency (Percentage)
Gender	Female	264(64)
-	Male	148(36)
Marital status	Married	296(72)
-	Single	116(28)
Education	Master's degree and higher	45(11)
-	Bachelor's degree	367(89)
Department name	Emergency	52(13)
-	Surgery	199(48)
-	Internal	117(28)
-	Intensive care	44(11)
Type of employment	Bonded	68(16)
-	Permanent	206(50)
-	Corporative	49(12)
-	Temporary	48(12)
-	Contract	41(10)
Type of Hospital	Educational	176(43)
-	Non-educational	236(57)

Prior to data analysis, the normality of quantitative study variables was checked through the Kolmogorov-Smirnov test, where only perceived quality of care was reported as normal.

3.1. Perceived Quality of Care and its Relationship with General Characteristics of Nurses

Table 2 shows the descriptive statistics of perceived quality of care and its dimensions. The score of perceived quality of care among the studied nurses was 4.79, which indicated a high level. The professional knowledge and skill dimension, with a score of 5.03 and the communication and positive attitude dimension with a score of 4.59 obtained the highest and lowest scores, respectively.

Table 2. Perceived quality of care score along with its dimensions.

Variable	Mean ± SD	Level
Respectful deference to others	4.81±0.47	High
Assurance of human presence	4.77±0.56	High
Communication and positive attitude	4.59±0.62	Medium
Professional knowledge and skill	5.03±0.56	High
Attention to other experiences	4.93±0.55	High
Perceived quality of care	4.79±0.46	High

The results of the independent t-test showed that there was a direct statistical relationship between perceived quality of care and the level of education (p=0.006), which indicated that the perceived quality of care score of nurses increased with increasing the level of education. According to Spearman's correlation test, there was an inverse statistical relationship between the perceived quality of care score with the variables of age (r=-0.105, p=0.033) and work experience (r=-0.112, p=0.013). So the perceived quality of care score decreased, with increasing age and work experience.

3.2. Patient Safety Culture and its Relationship with General Characteristics of Nurses

Table 3 shows the descriptive statistics of patient safety culture and its dimensions. The score of patient safety culture among the studied nurses was 3.35 and, at an average level. The overall perception of patient safety dimension, with a score of 4.82 and the non-punitive response error dimension, with a score of 2.40, obtained the highest and lowest scores, respectively.

Table 3. Patient safety culture score along with its dimensions.

Variable	Mean ± SD	Level
Frequency event reporting	2.97±0.48	Low
Overall perception of patient safety	4.82±0.58	High
Supervisor/manager expectations action promoting safety	3.61±0.54	Medium
Organizational learning continuous improvement	3.35±0.64	Medium
Teamwork within hospital units	3.63±0.59	Medium
Openness of communication channels	3.18±0.54	Medium
feedback and communication about error	3.43±0.67	Medium
Non-punitive response error	2.40±0.65	Low
Staff issues	2.46±0.62	Low
Management support for patient safety	3.34±0.6	Medium
Teamwork across hospital units	3.16±0.61	Medium
Exchange and transfer of information	3.46±0.5	Medium
Patient safety culture	3.35±0.23	Medium

The results of the Mann-Whitney test showed that there was a direct statistical relationship between the score of patient safety culture and the level of education (p=0.03), which indicated that nurses have a better understanding of patient safety culture with the increase in the level of their education. Based on the Spearman correlation test, there was a direct statistical relationship between the patient safety culture score and the variables of age (r=0.13, p=0.008) and work experience (r=0.119, p=0.016). So that, the patient safety culture score increased with increasing age and work experience.

3.3. Correlation between Patient Safety Culture and Perceived Quality of Care

Table 4 shows the correlation between patient safety culture and perceived quality of care from nurses. Patient safety culture was positively correlated with perceived quality of care (r = 0.226, p < 0.001). Patient safety culture was positively correlated with all dimensions of perceived quality of care. Also, perceived quality of care had a positive correlation with dimensions of overall perception of patient safety, Organizational learning continuous improvement, openness of communication channels, and non-punitive response error, and it had a negative correlation only with the dimension of staff issues (p= 0.05).

Table 4. Correlations among the study variables (N = 412).

Variable		Perceived Quality of Care	Perceived Quality of Care Dimension				
			Respect	Assurance	Knowledge and Skills	Communication	Attention to Experiences
Patient safety culture		r=0.226* *p*<0.001	r=0.300* *p*<0.001	r=0.165* *p*<0.001	r=0.149* *p*=0.002	r=0.100* *p*=0.043	r=0.159* *p*<0.001
-	Frequency event reporting	r=0.074 *p*=0.134	r=0.095 *p*=0.055	r=0.049 *p*=0.324	r=0.053 *p*=0.282	r=0.091 *p*=0.065	r=0.10* *p*=0.042
-	overall perception of patient safety	r=0.718* *p*<0.001	r=0.84* *p*<0.001	r=0.62* *p*<0.001	r=0.518* *p*<0.001	r=0.399* *p*<0.001	r=0.442* *p*<0.001
-	Supervisor/manager expectations action promoting safety	r=-0.039 *p*=0.426	r=0.002 *p*=0.96	r=-0.046 *p*=0.347	r=-0.090 *p*=0.067	r=-0.030 *p*=0.537	r=0.023 *p*=0.646
Patient Safety culture dimension	Organizational learning continuous improvement	r=0.099* *p*=0.046	r=0.109* *p*=0.028	r=0.092 *p*=0.061	r=0.10* *p*=0.043	r=-0.043 *p*=0.379	r=0.05 *p*=0.316
-	teamwork within hospital units	r=0.027 *p*=0.587	r=0.051 *p*=0.305	r=0.045 *p*=0.362	r=-0.049 *p*=0.323	r=0.003 *p*=0.956	r=0.079 *p*=0.11
-	Openness of communication channels	r=0.102* *p*=0.039	r=0.117* *p*=0.018	r=0.060 *p*=0.223	r=0.096 *p*=0.052	r=0.028 *p*=0.568	r=0.065 *p*=0.186
-	feedback and communication about error	r=0.065 *p*=0.189	r=0.066 *p*=0.179	r=0.083 *p*=0.091	r=0.014 *p*=0.771	r=0.014 *p*=0.775	r=0.068 *p*=0.168
-	non-punitive response error	r=0.146* *p*=0.003	r=0.111* *p*=0.025	r=0.125* *p*=0.011	r=0.191* *p*<0.001	r=0.011 *p*=0.826	r=0.030 *p*=0.869
-	Staff issues	r=-0.151* *p*=0.002	r=-0.109* *p*=0.027	r=-0.203* *p*=0<001	r=-0.074 *p*=0.132	r=-0.087 *p*=0.078	r=-0.155* *p*=0.002
-	Management support for patient safety	r=0.027 *p*=0.587	r=0.070 *p*=0.159	r=0.021 *p*=0.671	r=-0.006 *p*=0.909	r=0.009 *p*=0.850	r=0.040 *p*=0.416
-	Teamwork across hospital units	r=0.033 *p*=0.507	r=0.030 *p*=0.55	r=0.006 *p*=0.909	r=0.038 *p*=0.438	r=0.051 *p*=0.301	r=-0.004 *p*=0.939
Patient Safety culture dimension	Exchange and transfer of information	r=0.037 *p*=0.459	r=0.023 *p*=0.641	r=0.012 *p*=0.802	r=0.008 *p*=0.867	r=0.129* *p*=0.009	r=0.106* *p*=0.031

Table 5. Multiple linear regression model.

Variable	Unstandardized B	Coefficients Std.Error	Standardized Coefficients Beta	*p*-value
Patient safety culture	0.360	0.097	0.180	<0.001
Non- educational hospital	3.92	1.90	0.099	0.040
Bachelor's degree	-7.29	3.04	-0.116	0.017

3.4. The Relationship between Patient Safety Culture and Perceived Quality of Care while Controlling the Effect of other Variables

A multiple linear regression model was used to investigate the relationship between patient safety culture and perceived quality of care while controlling the effect of variables such as hospital type and education. Table **5** shows that the patient safety culture had an effect on the perceived quality of care (B=0.180), so with an increase of one score in the patient safety culture, the average score of the perceived quality of care increases by 0.36. Also, the average score of perceived care quality of nurses in non-educational hospitals was significantly higher than in educational hospitals (B=0.099) while controlling the effect of variables of patient safety culture and education. On the other hand, the average score of perceived quality of care in nurses with a bachelor's degree, while controlling the effect of patient safety culture variables and type of hospital, was significantly lower than that of nurses with higher degrees (B=-0.116).

4. DISCUSSION

This study was conducted with the aim of determining the relationship between perceived quality of care and patient safety culture among nurses working in hospitals affiliated with Mashhad University of Medical Sciences. In this study, the perceived quality of care among the studied nurses was evaluated at a high level, which is consistent with the findings of the studies of Karaca *et al*. [9], Chelik *et al*. [11], Daulay [30], HajiBabaee *et al*. [17], Darvishpour [31], Zare *et al*. [32]. The consistency of findings in different studies can be related to the following reasons: High educational standards in nursing, professional commitment of nurses to provide quality care to patients, positive organizational culture in nursing environments, gaining experience and clinical skills over time, continuous training and quality improvement programs.

In the present study, among the dimensions of perceived quality of care, only the dimensions of communication and positive attitude were at a medium level, and other dimensions were at a high level. In the studies of Karaca *et al*. [9], Chelik *et al*. [11], Daulay [30],

Hajibabaee *et al*. [17], and Zare *et al*. [32], all aspects of perceived quality of care were at a high level. The communication dimension and positive attitude refer to the psychological and social aspects of care. It seems that in order to improve this dimension, nurses should have a better understanding of the presence of patients in the hospital and their needs and behavior with respect and kindness towards patients. Nurses should always be concerned about patients during care so that patients feel more satisfied with the presence of nurses at their bedside. Several approaches, including improving communication skills and strengthening emotional intelligence, can help nurses to strengthen the dimension of communication and positive attitude in perceived quality of care. Nurses can create positive relationships and better communication with patients by strengthening active listening skills and, establishing eye contact and managing their own and others' emotions.

Among the demographic information of the nurses participating in this study, there was a statistically significant and inverse relationship between the perceived quality of care score and the variables of age and work experience. Hence, people with less age and work experience reported a more favorable perceived quality of care. In Daulay's study [30], the score of the quality of care perceived at the age of 31 to 40 was higher than the score of the quality of care perceived at the age of over 40, which was similar to the result of the present study. Still, in Mohammadi's study [33], there was a statistically significant and direct relationship between age and work experience with the perceived care quality score, so with increasing age and work experience, the perceived quality of care improved, which is different from the present study.

It seems that young nurses may be more motivated to provide patient care, continuous presence at the patient's bedside, and continuous learning due to their novelty and youth. Also, they may be trained with new technologies and methods that can affect the quality of their care. Because of their youth, these nurses often take care of patients with more energy and enthusiasm. However, it should be noted that according to the results of Mohammadi's study [33], experience and background also play an important role in providing quality care; a combination of youth and experience can bring the best results for patient care.

In the present study, there was a statistically significant relationship between the perceived care quality score and the level of education of individuals, so people with educational qualifications higher than a bachelor's degree (master's degree and doctorate) recorded a better understanding of the quality of care. This relationship can indicate that people with a higher education degree have received more training and their knowledge has led to a higher understanding of the quality of care. In Darvishpour's study [31], as in the present study, the level of education had a significant and direct relationship with the perceived care quality score. It appears that nurses with higher education have access to more knowledge and skills that directly contribute to providing better care to patients. They may be familiar with newer techniques and methods and use more optimal approaches in patient care. Also, more education can create a closer relationship with medical information that can help in patient care. In general, more education allows nurses to respond more actively and better to the needs of patients and increase the quality of care.

In this study, the patient safety culture among the studied nurses was evaluated at an average level and in need of improvement, which was consistent with the results of studies by Sheikhy-Chaman [18], Kim *et al*. [19], Granel-Giménez *et al*. [20], Singh [34], Daneshkohan *et al*. [35] and Kakemam [29].

The reasons for the relative uniformity of the findings in the mentioned studies can be attributed to various factors, including organizational, cultural and individual factors. Hospitals have similar work cultures that can affect the importance of patient safety. The existence of the same and similar rules and regulations can make hospitals follow the patient safety culture more seriously. People's awareness, attitude and belief can have a great impact on compliance with patient safety. Finally, it can be stated that the relative similarity in the results of different studies can be a combination of the above factors.

In the present study, among the dimensions of patient safety culture, the dimensions of frequency event reporting, non-punitive response error and staff issues were reported at a low level, the dimension of the overall perception of patient safety at a high level and other dimensions were reported at an average level. In Singh's study [34], dimensions of teamwork across hospital units, staff issues, exchange and transfer of information, non-punitive response error at a low level, dimensions of expectations and Supervisor/manager expectations action promoting safety, organizational learning - continuous improvement and management support for patient safety in high level and other dimensions were at the average level. In Sheikhy-Chaman's study [18], dimensions of exchange and transfer of information, management support for patient safety, openness of communication channels and overall perception of patient safety were reported at a low level and other dimensions at an average level. In Daneshkohan's study [35], the dimensions of non-punitive response errors, staff issues, and frequency event reporting were at a low level, and other dimensions were at an average level. In Kakemam's study [29], all dimensions were reported at a weak level and in need of improvement.

According to the results of the study, it can be emphasized that hospitals need more attention to improve patient safety culture. However, according to the dimensions of the patient safety culture, it seems that more attention should be paid to the dimensions of non-punitive response error, staff issues and frequency of incident reporting in improving the patient safety culture among nurses. In order to promote the culture of disclosing and reporting errors and consequently learning from errors and mistakes, hospital managers should try to

eliminate punitive responses in the event of errors and create suitable psychological conditions in the hospital to eliminate the fear of being punished and recording errors in the nurses' work files. Also, hospital managers should remove the obstacles in recording incidents and encourage nurses to record incidents without mentioning any personal details. Nurses are involved in various issues in the hospital that directly affect the level of patient safety culture. Things like improving the ratio of nurses to patients, justice in establishing the number of shifts and using flexible programs can be effective on issues related to employees.

Among the demographic information of the nurses participating in this study, there was a statistically significant and direct relationship between the score of patient safety culture and the variables of age and work experience, so people with more age and work experience recorded a higher patient safety culture score. Also, there was a statistically significant relationship between the score of patient safety culture and the level of education of people, so that people with educational qualifications higher than bachelor's degree (master's degree and doctorate) had a higher understanding of patient safety culture. In Salamat's study [21], the gender variable had a statistically significant relationship with the patient's safety culture, so women reported a higher score than men. In Daneshkohan's study [35], patient safety culture had a significant and direct relationship with the level of education, so people with a master's degree had a better situation than people with a bachelor's degree, which is consistent with the present study. It seems that people with higher educational degrees have received more training and their knowledge has led to a higher understanding of patient safety culture. Experienced nurses naturally have a higher understanding of patient safety culture due to past experiences and learning. They are also more aware of the importance of patient safety due to their background and experience. Nursing managers of hospitals, who are usually people with a higher age and work experience than other people, try to improve the level of patient safety culture and create a safe environment for nurses and patients by creating and spreading a safety culture and encouraging nurses. Also, these people give more importance to teamwork and play a supporting role for others in the hospital.

The results of the present study showed that there is no significant difference between the culture of patient safety and the type of department where nurses work. It seems that the following factors can be a reason for the same safety culture in all departments of the studied hospitals:

Integrated leadership and management, planning and implementation of continuous training programs, use of standard policies and protocols for patient care, the existence of a positive organizational culture regarding the issue of patient safety, continuous monitoring and evaluation to ensure compliance with patient safety standards and quality of care.

In general, there was a significant and direct relationship between perceived quality of care and patient safety culture, so with the increase of patient safety culture, perceived quality of care increased. Patient safety culture was positively correlated with all dimensions of perceived quality of care. Perceived quality of care had a significant relationship with dimensions of overall perception of patient safety, organizational learning continuous improvement, openness of communication channels, non-punitive response error and staff issues, which was only inversely related to staff issues dimension and direct to other dimensions.

The general result of this study was consistent with Karaca's study [9]. In Karaca's study [9], the perceived quality of care had a positive correlation with the patient safety culture, and all dimensions of the perceived quality of care had a statistically significant and direct relationship with all dimensions of the patient safety culture. According to the results obtained, it can be concluded that training courses for nurses about the importance of patient safety and their role in promoting safety culture, creating effective communication through multi-specialty teams and strengthening team cooperation, strengthening reporting errors without fear of punishment, root analysis of errors to prevent the repetition of errors and learning from experiences and finally providing continuous feedback to nurses about their performance can lead to creating a safer and higher quality work environment, which ultimately helps to improve the quality of care perceived by nurses and increase patient safety.

Using the multiple linear regression model, the findings of this study showed that the patient safety culture had an effect on the perceived quality of care while controlling the effect of hospital type and education variables. So by increasing one score in the patient safety culture, the average score of perceived quality of care increased by 0/36. Also, the average score of perceived quality of care in nurses in non-teaching hospitals was significantly higher than in teaching hospitals. On the other hand, the average score of perceived quality of care in nurses with a bachelor's degree was significantly lower than that of nurses with higher degrees. It seems that reasons such as focusing on patient care, simpler interactions, fewer students and interns, and less work pressure are the factors that lead to a higher score of the quality of care perceived by nurses in non-teaching hospitals compared to teaching hospitals. In non-teaching hospitals, they mainly focus on providing services to patients, while in teaching hospitals, in addition to patient care, they also have educational and research duties, which can divert attention from patient care to education and research. On the other hand, in non-teaching hospitals, the organizational structure may be simpler and the interactions between nurses, doctors and other medical staff may be less complex, which can help improve the communication of nurses and thus lead to a higher quality of care. Teaching hospitals usually host medical students, nurses and other fields related to health. These people require training and supervision, which can put more pressure on nurses and reduce their focus on patient care.

5. STUDY LIMITATIONS

One of the reasons for the non-cooperation of the nurses was their busy work, so they tried to communicate effectively with the nursing service office and choose the best time in each work shift to refer to the wards.

CONCLUSION

This study reveals that while nurses possess a solid understanding of care quality within their hospital environments, their perception of the patient safety culture is somewhat mixed. A noteworthy finding is the statistically significant direct relationship between nursing care behaviors and the understanding of safety culture. When examining demographic factors, age and work experience demonstrated an inverse and direct relationship with care behavior and patient safety culture, respectively. In contrast, higher educational levels were positively correlated with both caring behavior and patient safety culture, indicating that nurses with advanced qualifications have a better grasp of these concepts. Therefore, enhancing education and training related to caring behaviors and safety culture among nurses is essential for improving both patient safety culture and perceived care quality. The study also highlights that enhancing all dimensions of nursing care behaviors can lead to a better understanding of patient safety culture. Conversely, fostering a positive perception of patient safety, promoting continuous organizational learning, maintaining open communication channels, and implementing non-punitive responses to errors can significantly enhance care quality. Elevating the quality of care is crucial as it directly impacts morbidity and mortality rates—key final health outcomes—and contributes to overall patient satisfaction, which is another vital goal for health systems worldwide.

Recommendations for Nursing Schools, Managers, and Policymakers:

To strengthen the relationship between care quality perception and patient safety culture, nursing schools should integrate comprehensive curricula focusing on patient safety principles and effective communication strategies. Healthcare managers should foster an environment that encourages continuous professional development and supports open discussions about safety concerns without fear of punitive measures. Additionally, policymakers should prioritize funding for training programs aimed at enhancing nurses' competencies in both caring behaviors and safety culture, ensuring that these critical areas are addressed systematically within healthcare organizations.

AUTHORS' CONTRIBUTION

J.M.: Study conception and design were contributed; J.A.: Data collection was provided; V.G.: Analysis and interpretation of results were presented; and R.R.: Drafted the manuscript. All authors reviewed the results and approved the final version of the manuscript.

LIST OF ABBREVIATIONS

HSOPSC	=	Hospital Survey on Patient Safety Cultur
CBI	=	Caring Behaviors Inventor
MUMS	=	Mashhad University of Medical Sciences

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the ethics committee of Mashhad University of Medical Sciences, Iran (IR.MUMS.FHMPM.REC.1402.082).

HUMAN AND ANIMAL RIGHTS

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Verbal consent was obtained from the study participants.

STANDARDS OF REPORTING

STROBE guidelines have been followed.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study are available from the corresponding author [S.S.T] upon reasonable request.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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