



The Relationship between Patient Safety Culture and Missed Nursing Care among nurses of Shahid Sadoughi University of Medical Sciences

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DOI: [10.22037/anm.v33i3.46335](https://doi.org/10.22037/anm.v33i3.46335)

Submitted: 09 Feb 2024

Accepted: 05 Jun 2024

Published: 15 Jul 2024

Keywords:

Patient Safety Culture
Missed Nursing Care
Nursing

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How to cite:

Fallah B, Bolandian-Bafghi Sh, Nasiriani Kh, Tavangar H, Nabiazadeh-Gharghozar Z. The relationship between Patient Safety Culture and Missed Nursing Care among Nurses of Shahid Sadoughi University of Medical Sciences. *Adv Nurs Midwifery*. 2024;33(3):1-8. doi: 10.22037/anm.v33i3.46335

Abstract

Introduction: Cultivating a patient safety culture within an organization is essential for enhancing patient safety. This culture is closely tied to nursing practices, and any lapses in care can significantly compromise the delivery of safe nursing services. As such, missed nursing care is closely associated with the broader patient safety culture. This study aims to explore the relationship between patient safety culture and missed nursing care.

Methods: This descriptive-correlational study was conducted between 2022 and 2023 with nurses at Shahid Sadoughi University of Medical Sciences. The inclusion criteria were: having a minimum of a bachelor's degree in nursing, at least six months of experience in the department, and willingness to participate. Stratified random sampling was used for participant selection. Data were collected using a demographic questionnaire, the Kalisch and Williams Missed Nursing Care Questionnaire, and the HSOPS Questionnaire. Data analysis was performed using SPSS software (version 22), with statistical methods including descriptive statistics, t-tests, one-way ANOVA, linear regression, and Pearson correlation.

Results: The study sample comprised 233 nurses, including 94 males and 139 females. The results revealed a statistically significant difference in the mean score of overall patient safety culture based on work experience (p-value < 0.001), working hours (p-value < 0.001), and work shifts (p-value < 0.001). However, no significant difference was found in the total mean score of missed nursing care across different age groups (p-value = 0.287), work experience (p-value = 0.294), and shift work (p-value = 0.059), although a significant difference was observed with weekly working hours (p-value = 0.002). These findings were further supported by univariate linear regression analysis. The Pearson correlation coefficient indicated a significant negative correlation between missed nursing care and patient safety culture.

Conclusions: This research enhances our understanding of the relationship between patient safety culture and missed care. By exploring this connection, it provides empirical evidence for improving care quality and its management, while also laying the groundwork for future research in this area.

INTRODUCTION

Patient safety is a critical and essential component of healthcare systems, recognized as one of the core elements of quality within these organizations. Patient safety is a highly important and necessary part of healthcare systems and is considered one of the main elements of quality in these organizations [1]. Currently, focusing on patient safety is also a main concern in the provision of hospital services, and any deficiency in this area can lead to undesirable consequences [2].

Unsafe care is a leading cause of death and injury worldwide. According to estimates from the World Health Organization (WHO), one in every ten patients is harmed by unsafe practices during hospital care [3]. Also, in low and middle-income countries, 134 million harmful incidents occur in hospitals every year due to unsafe care, and 75% of these errors could be prevented by establishing a patient safety culture [4]. The existence of a patient safety culture reduces the severity of errors [5], and despite this importance, studies conducted in Iran indicate that the patient safety culture in Iranian hospitals is average and weak [6]. With the implementation of a patient safety culture, employees can report unwanted complications without fear and have the opportunity to learn from their mistakes. This, in turn, prevents systematic errors and enhances patient safety [7]. An emerging body of evidence also suggests that features inherent in a better patient safety culture, such as attention to workload, organizational priorities, and communication are associated with less missed nursing care by supporting nurses to do the important work they perform every day [8].

As the largest workforce in the healthcare industry, nurses play a crucial role in ensuring the safety and quality of care provided in hospitals [9]. The culture of patient safety is closely tied to the nursing care provided [8]. Therefore, missed nursing care can be a serious threat in achieving comprehensive and safe nursing care. Missed nursing care has been described as care that is delayed, partially completed, or not completed at all for patient. It has also been called nursing care left undone and unmet nursing care needs [10]. The missed nursing care includes medication errors by nurses, lack of hand washing, and failure to record vital signs [11]. Missed care increases the likelihood of medical errors, with about 13.5% of patients experiencing at least one preventable adverse event during their hospital stay [8]. A study in Iran reported that the rate of missed nursing care was below average, however with proper management and reduced nurses' workload, the rate of missed care could be further reduced [12]. Another study in Iran showed 72.1% of the nurses reported that they missed at least one nursing care item on their last shift [10].

Missed nursing care increases complications, lengthens hospital stays, and reduces patient safety [13]. Reducing instances of Missed Nursing Care requires cultivating a strong culture of patient safety within the organization, which is vital for driving improvements and ensuring high standards of care [8]. Currently, most developing nations acknowledge the critical role of promoting safe behaviors, values, beliefs, and attitudes among employees and organizations in preventing accidents [14].

These omissions can elevate the risk of iatrogenic complications, including pneumonia, pressure ulcers, urinary tract infections, and delirium, which are common forms of missed nursing care [15]. Consequently, it has become a burgeoning concern on an international scale [16]. The omission of nursing care has become a significant issue in many hospitals, posing a challenge linked to characteristics like nurse guilt, the inability to address situations, and fear [17]. The current state of research on the association between patient safety culture and Missed nursing care is inconclusive. A favorable patient safety culture is believed to exhibit a potential association with the Existence of Missed nursing care, but previous research has provided inconsistent results about this potential correlation. A positive safety culture has been linked in some research to a probable decrease in the number of nursing care opportunities that are missed, while other research has failed to find a significant association between the two [18]. It seems that the science of missing nursing care is still in its early stages, and further studies are needed to increase awareness on this subject [19]. On the other hand Most of the research in this area has been carried out in developed countries [18]. The results may not directly reflect the unique challenges faced by healthcare professionals in countries such as Iran. Therefore, the researchers chose to conduct this study to explore the following question: Is there a relationship between patient safety culture and missed care among nurses?

METHODS

Study Design and Participants

This descriptive-correlational study was conducted in 2022-2023, at the hospitals of Shahid Sadoughi University of Medical Sciences in Yazd, Iran. Inclusion criteria were a bachelor's or higher degree in nursing, working in the concerned department for at least 6 months, and willingness to participate in the study. The exclusion criteria was the leave of nurses during the study period. Sampling was done through a stratified random sampling method. First, the list of nurses working in each hospital was obtained from the hospitals' nursing offices. Then, the number of nurses needed from each hospital was calculated and the

required number of nurses was randomly selected from the lists. The sample size of 230 people was calculated by considering the confidence level of 95% and the power of 80%, a correlation coefficient of 0.4, an error rate of 0.15 and the following formula:

$$n = \left[\frac{Z_{1-\frac{\alpha}{2} + z_{1-\beta}}}{C} \right]^2 + 3$$

$$C = 0.5 \times \ln \left[\frac{(1+r)}{(1-r)} \right]$$

Data Collection Instruments

The questionnaires include a demographic information form that gathers data on variables such as age, gender, marital status, employment, work department, shift type, and nursing work history. Another questionnaire used is the Missed Nursing Care Questionnaire, developed by Kalisch and Williams in 2009 and subsequently psychometrically validated. This questionnaire consists of 24 items, each utilizing a Likert scale. Respondents rate each item with five possible answers: 'never' (0 points), 'rarely' (1 point), 'sometimes' (2 points), 'often' (3 points), and 'always' (4 points). The total score ranges from 24 to 96. A higher score indicates a greater amount of missed nursing care, while a lower score suggests less missed care (16).

The content validity of this questionnaire was assessed both qualitatively and quantitatively. To determine content validity, a content validity index of 0.89 was obtained through review and ranking by three panels of nursing experts. To evaluate the reliability of the instrument, the test-retest method and internal consistency were employed. The Pearson correlation coefficient (retest) for the overall questionnaire was 0.87, and the Cronbach's alpha coefficient ranged from 0.64 to 0.86. Consequently, this tool meets rigorous psychometric standards [20, 21].

The validity of the Persian version was established through face and content validity in Baljani et al.'s study, while its reliability was confirmed with a Cronbach's alpha of 0.90 [22, 23]. The reliability of the questionnaire was reconfirmed by a Cronbach's alpha of 0.98. Another data collection tool is the Hospital Survey on Patient Safety Culture (HSOPSC), which was designed by the Agency for Healthcare Research and Quality in 2004 with 42 items. Although initially developed in the USA, the HSOPSC has been extensively utilized internationally, including in countries within the Middle East region, to examine and assess perceptions regarding patient safety culture in hospital environments [24]. The perception of employees in 12 dimensions of patient safety culture is assessed including 1) frequency of reporting incidents, 2) general understanding of existing safety, 3) support of hospital management for patient safety, 4) organizational learning, 5) team work, 6) openness of communication channels, 7) communication and providing feedback about errors, 8) the non-punitive

response in cases of trouble, 8) work issues related to employees, 9) actions of unit supervisor in the direction of patient safety, 11) teamwork between organizational units, 12) openness of communication channels. It also contains two questions including: 1- What score do you consider for patient safety and 2- How many cases of reporting errors have you had in the past 12 months? The scale of responding to the statements in a 5-point Likert scale from always to never with a score of 5 to 1, respectively, and the range of scores for the 42 main statements of the questionnaire is between 42 and 210. In the final analysis, dimensions with an average percentage of positive answers of at least 70% (147) are part of a good safety culture, those with a percentage between 50% and 70% (105-147) are considered neutral, and those with less than 50% (105) are considered to have a weak safety culture.

In the final analysis, dimensions whose average percentage of positive answers is at least 70% (147), part of a good safety culture, between 50 and 70% are neutral (105-147) and in cases where it is less than 50% (105), as they were considered to have a weak safety culture. Babaie et al. reported Cronbach's alpha of Persian version of the Hospital Survey on Patient Safety Culture Questionnaire (HSOPSC) was evaluated at 0.79, and the stability was 0.82 ($p < 0.001$) [25].

Procedures

In this study, after obtaining approval for the plan and receiving permission from the Vice President for Research, an ethics code was obtained from the ethics committee. Following this, visits were made to hospitals affiliated with Yazd University of Medical Sciences, and a list of nurses from various units was received. Nurses who met the entry criteria were then randomly selected and included in the study. The questionnaire was subsequently distributed to them, and they completed it using a self-report method.

Ethical Considerations

This study was approved by the Committee of Ethics in Human Research at Shahid Sadoughi University of Medical Sciences and health services in Yazd (IR.SSU.RSI.REC.1401.013). The study objectives and entry conditions were clearly explained to the participants, and informed, voluntary consent was obtained for participation. They were assured that all information provided and their identities would remain confidential, and they were informed of their right to choose whether or not to participate in the study.

Data Analysis

The data analysis was conducted using SPSS software version 22. The descriptive statistics utilized were mean, standard deviation, and relative frequency, while the inferential statistics included t-tests, one-way analysis of variance, linear regression, and the Pearson correlation coefficient. A significance level of 0.05 was applied.

RESULTS

The study included 233 nurses, consisting of 94 males and 139 females. The mean age of the participants was 32.61 years ($SD = \pm 8.39$). Participants had work experience ranging from 6 months to over 20 years, with approximately 56% of individuals having between 1 and

10 years of work experience (mean = 8.76, $SD = \pm 10$). In terms of weekly working hours, 33.5% worked 41-45 hours, 22.7% worked 36-40 hours, and 21.9% worked 51-55 hours per week. The majority of participants (64%) were on rotating shifts (Table 1).

Table 1. Relationship of patient safety culture and missed care with participant characteristics

	N	%	Patient safety culture			Missed care		
			Mean	SD	Sig.	Mean	SD	Sig.
Sex					0.770			0.201*
Woman	139	59.7	127.3	17.11		50.37	13.73	
Man	94	40.3	127.91	17.61		48.11	12.86	
Age(year)					0.302			0.287**
20-30	114	48.9	129.75	17.64		47.72	13.45	
31-40	64	27.5	126.33	16.78		50.47	14.31	
41-50	51	21.9	124.55	17.79		50.67	11.36	
>50	4	1.7	128.00	8.83		42.00	7.96	
Work experience in hospital (year)					<0.001			0.294**
1>	19	8.2	134.95	13.72		52.58	18.09	
1-5	65	27.9	133.17	17.18		47.09	14.20	
6-10	66	28.3	121.08	18.14		51.15	12.06	
11-15	37	15.9	124.08	15.47		47.84	12.73	
16-20	46	19.7	129.09	15.89		48.17	11.22	
Working hours (in week)					<0.001			0.002**
30-35	13	5.6	136.00	10.12		45.00	10.17	
36-40	53	22.7	131.55	15.58		46.19	12.56	
41-45	78	33.5	133.53	16.63		48.27	13.63	
46-50	32	13.7	129.22	17.13		46.25	15.74	
51-55	51	21.9	111.53	12.21		55.69	10.27	
≥56	6	2.6	127.00	10.69		50.67	12.06	
Shift type					<0.001			0.059**
Morning shift	27	11.6	130.48	13.46		47.63	13.76	
Evening shift	11	4.7	117.09	15.33		46.27	7.68	
Night shift	46	19.7	109.35	8.38		53.72	5.17	
Rotating	149	64	133.55	15.97		48.03	14.85	

*Independent t test, ** One way ANOVA

Table 2. Linear Regression analysis on independent variables with patient safety culture and missed nursing care

Model	Unstandardized Coefficients		Unstandardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Patient safety culture					
1 (Constant) work experience in the hospital	133.147	30.053		43.612	0.000
	-1.770	.911	-.127	-1.942	0.050
2 (Constant) Working hours in week	145.702	2.937		49.613	0.000
	-5.452	.828	-.397	-6.583	0.000
3 (Constant) shift type, 4 (Constant), working hours per week	115.718	3.877		29.849	0.000
Missed nursing care					
	3.547	1.105	.207	3.211	0.002
	41.227	2.375		17.356	0.000
	2.353	.670	.225	3.512	0.001

a. Dependent Variable: Patient safety culture, missed nursing care

Table 3. Correlation coefficient between patient safety culture and missed nursing care

Criteria	Min-max	Mean $\pm$ SD	Patient safety culture	Missed nursing care
Patient safety culture	98-178	127.64 $\pm$ 17.372	1	-0.447*
Missed nursing care	24-96	49.02 $\pm$ 13.234	-0.447*	1

*. Pearson test, Correlation is significant at the 0.01 level (2-tailed).

The findings also revealed that, among the components related to patient safety culture, the highest score was attributed to hospital management's support for patient safety, while the lowest score was given to non-punitive

responses in the event of issues. The findings revealed that there is no significant difference in the average score of patient safety culture among different age groups of nurses (p -value = 0.302). However, a significant

difference was noted in the average score of patient safety culture among various groups based on work experience in the hospital (p -value < 0.001). A significant difference was observed in the overall score of patient safety culture among nurses with less than one year and 6 to 10 years of working experience (p -value = 0.014), as well as between nurses with 1 to 10 years of working experience in the hospital (p -value < 0.001) and different working hours per week (p -value < 0.001). The mean (standard deviation) of the overall score of patient safety culture for nurses with working hours of 30 to 35 hours per week is 136.00 ± 10.12 , and for nurses with working hours from 56 to 60 hours per week is 127.00 ± 10.70 . The mean overall score of patient safety culture was significantly different between different work shift groups (p -value < 0.001) (Table 1).

In the univariate linear regression model analyzing variables such as age, sex, work experience in the hospital, weekly working hours, and shift type in relation to the dependent variable of patient safety culture, the results of the significance tests for the independent variables of work experience in the hospital (p -value = 0.050, $B = -1.77$), weekly working hours (p -value < 0.001 , $B = -5.45$), and shift type (p -value = 0.002, $B = 3.55$) were found to be statistically significant (Table 2). There was no significant difference in the mean score of missed nursing care among the different age groups (p -value = 0.287), levels of working experience in the hospital (p -value = 0.294), and work shifts (p -value = 0.059). However, a significant difference was observed in the number of nursing hours worked per week (p -value = 0.002), with missed care occurring more frequently (55.69%) for nurses working between 51 and 55 hours per week (see Table 3). The univariate linear regression model also confirmed a relationship between working hours per week and missed nursing care (p -value = 0.001, $B = 2.35$) (Table 2).

The Pearson correlation coefficient indicated that there is a significant indirect correlation between missed nursing care and patient safety culture ($r = -0.447$, p -value < 0.001) (Table 3).

DISCUSSION

In this study, we investigated the relationship between missed nursing care and patient safety culture. Our findings reveal a clear relationship between missed nursing care and patient safety culture. Additionally, the study's results indicated that the patient safety culture level within the investigated hospitals was average. Similarly, in the study carried out by Kazemi et al., on nurses in Ardabil and Khalkhal, the level of patient safety culture was reported as average [26]. While Azyabi [27] and Stoyanova [28] showed that the examined hospitals were not in a good condition in terms of patient safety culture, but vatani et al., reported the level of patient safety in Tehran hospitals as favorable [29], which is

contrary to the findings of the present study. This disparity underscores the varied nature of patient safety culture across different healthcare systems, cultural contexts and the time and place of the studies.

Among the components related to patient safety culture, the highest score was attributed to expectations and management actions aligned with patient safety, while the lowest score was given to non-punitive responses to error events. This contrasts with findings from a Canadian study (30), where the component related to expectations and management actions was reported as weak, and a study by Dehghani et al., which reported it as moderate [30]. The discrepancy in the results can be explained by the time of the studies and the importance and improvement of the patient's safety level in recent years. In this study, the lowest score obtained in the fields of patient safety culture was given to the non-punitive response, which is in line with the studies; Because studies conducted in recent years show that the weakest area related to patient safety culture is the adoption of a non-punitive response before errors occur [31].

The findings also showed that although there is no cross-cultural relationship between patient safety and nurses' age, it is correlated to their work experience. So that in the first year of nurses' service, there is the highest amount of patient safety culture, decreasing with the rise of work experience. This finding is inconsistent with those of the study conducted by Bandvik et al. who suggested that there is no relationship between nurses' work history and patient safety [32]. Meanwhile, Gans et al. found that the culture of patient safety increases in nurses with experience [33]. The discrepancies in findings may be attributed to the context and timing of the studies. Additionally, some researchers suggest that nurses with more work experience may perceive patient safety culture differently, believing that laws and regulations are insufficient in preventing errors and enhancing patient safety [32].

There was also a relationship between the working hours of nurses and the shift type they have with patient safety culture, so that as working hours rose, the amount of patient safety culture decreased, and this decrease is especially evident in night shifts. This finding is consistent with the findings of the study conducted by Hayashi et al. (2020). Our findings suggest that night shift and long working hours and reduction of nurse's vacation days are associated with lower patient safety culture [34]. Similarly, Chu et al.'s showed that increasing the working hours of nurses, especially long shifts, leads to a decrease in the quality of patient care and an increase in the possibility of errors in nurses [9]. In this regard, the findings of Griffiths et al.'s (2013), conducted on 12 European countries, showed that long shifts lead to a decrease in patient safety. Although the relationship between the number of working hours and

patient safety has not been determined in this study, the findings revealed that increasing shift hours to more than 12 hours leads to a decrease in the quality of nurses' work and a reduction in patient safety [35]. In summary, higher the working hours for any reasons leads to a decrease in patient safety culture.

The findings of the present study indicated that, while no relationship was found between shift types and missed care, a significant association was observed with working hours. As working hours increased, the incidence of missed care also rose. Similarly, Bae et al. reported in their review study that nurses working more than 40 hours per week are at a higher risk of making errors in patient care [36]. Blandian et al. (2017) demonstrated a relationship between the increase in working hours and the occurrence of medication errors among nurses. Specifically, as working hours increased, the frequency of medication errors also rose [37]. The reason for these findings could be the fatigue and reduced concentration of nurses during long shifts and night shifts, which naturally leads to an increase in missed nursing care [38].

Our study also concluded that there is a significant indirect relationship between patient safety culture and missed care. As the culture of patient safety improves, the incidence of missed care decreases. In line with this, Hessel et al. reported that a stronger patient safety culture contributes to a reduction in missed care. They suggested that nursing managers can enhance the quality of nursing care and reduce errors by fostering an environment that promotes patient safety and a positive safety culture [8]. Similarly, Kim et al found that missed nursing care is influenced by factors in the nurse's work environment and patient safety culture. Therefore, missed nursing care can be managed through the implementation of interventions that can promote patient safety culture [39]. In line with the findings of the above studies, I-Chi Chen (2021) in their study conducted in Taiwan reported that the promotion of patient safety culture in health care organizations is vital for improving the quality of care, as well as reducing errors [40]. The findings suggest that a strong culture of patient safety, along with its proper understanding by nurses, influences nursing practices. Therefore, promoting a culture of patient safety can reduce missed care among nurses.

Limitations: Filling out the questionnaires relied on memory and self-reporting, making it susceptible to bias from concerns about social standing and variations in memory recall. Additionally, given the cross-sectional design of this study, caution is needed when attempting to apply its findings broadly, as they may be impacted by location and timing.

CONCLUSION

By closely focusing on improving the patient safety culture and the factors that influence it, it is possible to significantly enhance patient care. This implies that while individual factors of nurses may impact missed care, organizational factors such as patient safety culture play a more substantial role. This emphasizes the importance for managers and officials to prioritize this aspect. By recognizing the significance of patient safety culture, they can implement measures to reinforce it, minimize instances of missed nursing care, and consequently, prevent additional costs from being incurred by the healthcare system and patients. Furthermore, the reduction in missed nursing care will improve satisfaction among patients, community members, nurses, and other healthcare staff.

ACKNOWLEDGEMENTS

The authors express their gratitude to the Yazd Shahid Sadoughi University of Medical Sciences and health services, and participating in the study. The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

ETHICS CONSIDERATIONS

This study was carried out in accordance with the Declaration of Helsinki. This study was approved by the Committee of Ethics in Human Research at Shahid Sadoughi University of Medical Sciences and health services in Yazd (IR.SSU.RSI.REC.1401.013). In addition, informed written consent forms were obtained from all participants.

CONFLICT OF INTERESTS

The authors declare that they have no competing interests.

FUNDING

This study was supported by a grant from Shahid Sadoughi University of Medical Sciences and health services, (IR.SSU.RSI.REC.1401.013) Yazd, Iran. The grant supported data collection process. The funders had no role in the design of the study and collection, and analysis, interpretation of data. The authors send the report of the study's findings to funder at the end of the study.

AUTHORS' CONTRIBUTIONS

SHB & BF & KHN conceptualized and designed the study. BF & SHN & HT collected the data. SHN & BF & KHN & ZNG analyzed the data. All authors have met criteria for authorship and had a role in preparing the manuscript. Also all authors approved the final manuscript.

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