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Nurses' Performance as a Mediator Between Nurses' Fatigue and Patient Safety Culture: A Structural Equation Model Analysis

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Received: 29 September 2023 | **Revised:** 5 February 2025 | **Accepted:** 13 February 2025

Funding: This study was funded by vice-chancellor of research of Shiraz University of Medical Sciences, Iran (No.: 26246).

Keywords: fatigue | nurse performance | patient safety culture | structural equation model

ABSTRACT

Aim: To determine the relationships among nurses' fatigue, nurses' performance and patient safety culture.

Design: Cross-sectional study.

Methods: A multicentre study was conducted with 308 nurses working in 14 medical and surgical wards from four teaching hospitals in Iran. The sampling method was stratified with a proportional allocation. Data were collected via a demographic form, the Occupational Fatigue/Exhaustion Recovery (OFER-15), the Nurse Performance Instrument (NPI) and the Hospital Survey on Patient Safety Culture (HSOPSC). The data were analysed via structural equation modelling (SEM).

Results: Nurse fatigue was significantly inversely related to performance and patient safety culture ($p < 0.001$). Path analysis revealed that each unit of reducing nurses' fatigue improved patients' safety culture by 0.286 units and that each unit of improved nurse performance improved patients' safety culture by 0.360 units. Additionally, each one-unit increase in a nurse's fatigue could decrease his or her performance by 0.860 units. SEM analysis confirmed the mediating effect of nurses' performance on the relationship between their level of fatigue and patient safety culture.

Practice Implications: The proposed model can assist nursing managers and healthcare policymakers in developing practical strategies to mitigate and reduce nurses' fatigue and, consequently, improve nurses' performance and patient safety.

Patient or Public Contribution: All participants contributed to this research by completing self-reported scales.

1 | Introduction

Nurses are constantly susceptible to fatigue due to heavy workloads, job-related stress and nonstandard work schedules. Nurse fatigue is a global concern. Over 90% of nurses experience fatigue (Cho and Steege 2021; Steege et al. 2017). Nurse fatigue is a multidimensional concept that refers to a work-related condition that ranges from acute to chronic. It can result in an overwhelming sense of tiredness, decreased energy and exhaustion; ultimately, it affects physical and cognitive functions (Smith-Miller et al. 2014). Various statistics on the prevalence of nurse fatigue have been reported in Iran, but on average, it is estimated to be greater than 50% (Bazmandegan et al. 2022; Behboodi et al. 2015).

According to the American Nurses Association (ANA), reducing nurses' fatigue is an important issue in patient safety (Fagerström et al. 2018). When nurses do not recover adequately during off-duty times, fatigue accumulates and becomes chronic, compromising

work performance, patient safety and quality of care. A recent study revealed that 12-h night shifts affect patient and nurse safety and lead to a decrease in both components (James and James 2023). Nurse fatigue has consequently led to poor outcomes such as job dissatisfaction, job burnout, long vacations, turnover and the intention to leave (Ma'mari et al. 2020). Additionally, it increases mental acuity and leads to adverse patient events such as needle-stick injuries and medical errors (Cho and Steege 2021).

Recent studies during the COVID-19 pandemic have shown that varying levels of nurse fatigue can influence nurses' performance. Factors such as increased workload, highly technical and demanding work, long working hours, many night shifts and inadequate resources have been identified as predictors of nurses' fatigue and reduced performance (Alharbi et al. 2020; Ruiz-Fernández et al. 2020; Zhan et al. 2020).

Nurses' performance is an integral part of the nursing profession and is crucial for achieving organisational goals. It reflects the quality of delivered care and consequently patient outcomes. Poor performance as a result of a slower recovery, increased hospitalisation, higher costs, severe harm or even the death of patients is considered a risk factor for patient safety (Labrague and de los Santos 2021; Wilson et al. 2019).

Patient safety is a common international priority across healthcare organisations worldwide. Patient safety culture is one of the main elements of promoting safety and enhancing the quality of patient care. It is defined as a set of attitudes, values, beliefs, perceptions, competencies and standards of individual and group behaviour that healthcare providers share about patient safety during the delivery of healthcare (Reis et al. 2018). An organisation with a safe culture acknowledges the inherently risky nature of its activities and creates conditions where individuals can freely report errors without fear of punishment. In this context, all levels of the organisation are expected to collaborate to find solutions (Fassarella et al. 2019).

During the outbreak of COVID-19, healthcare systems worldwide, including Iran, faced excessive workloads, inadequate resources and nurse exhaustion, which could threaten patient safety. Studies have shown that more than 50% of nurses experience fatigue (Lee and Choi 2022; Teng et al. 2020). High levels of fatigue lead to a remarkable disturbance in nurses' performance and, subsequently, patient safety (Ardıç et al. 2022). The results of a systematic review in 2021 revealed that high levels of fatigue in nurses resulted in outcomes such as mental health problems and decreased nursing performance, ultimately reducing patient safety (Cho and Steege 2021). Therefore, examining nurse fatigue and its impact on outcomes during the post-COVID-19 period is essential. Although studies in Western countries have focused on the effects of fatigue on performance and influencing factors, few studies in developing countries (Cho and Steege 2021; Habibzadeh et al. 2020) have addressed the impact of fatigue on nurses' performance and patient safety, especially in the post–COVID-19 era. Thus, further research in this area is crucial.

The present study used a structural equation model (SEM) to investigate the relationships between nurses' fatigue, nurses' performance and patient safety culture.

2 | Methods

2.1 | Design, Settings and Participants

This was a cross-sectional and multicentre study conducted in 14 medical-surgical wards of four teaching hospitals affiliated to Shiraz University of Medical Sciences, Iran, from October 2022 to February 2023. The sampling method was stratified randomly with proportional allocation. The sample size was calculated via G*Power software with a power of 90% and an α value of 0.05, using a similar method (Di Muzio et al. 2019) and considering a 20% attrition rate, resulting in a total of 308 individuals. The inclusion criteria were a willingness to participate, a bachelor's degree or higher and at least 6 months of work experience in internal or surgical wards. The exclusion criterion was incomplete questionnaire responses.

2.2 | Measures

2.2.1 | Social–Demographic Questionnaire

This form included general information about age, gender, marital status, education level, position, years of working experience and shift work.

2.2.2 | Occupational Fatigue/Exhaustion Recovery (OFER-15) Scale

Winwood et al. (2005) in Australia developed and validated the OFER-15 scale to measure work-related fatigue. Although there are other scales to measure fatigue, none include a measure of effective recovery from fatigue, and they do not distinguish between acute and chronic fatigue components well. The scale consists of 15 items and covers three subscales: chronic fatigue (items 1–5), acute fatigue (items 6–10) and inter-shift recovery (items 11– 15). It is scored on a 7-point Likert scale ranging from *completely disagree* to *completely agree*. The total score of the OFER ranged from 15 to 105. Scores between 15 and 45 indicate mild or low fatigue, scores between 45 and 75 indicate moderate fatigue and scores above 75 indicate high fatigue. Winwood et al. (2005) confirmed the validity of the tool via factor analysis and test/retest reliability. In this study, the Persian version of the scale, which was validated by Javadpour et al. (2014), was used. The Cronbach's alpha coefficient for the subscales was reported as follows: 0.80 for chronic fatigue, 0.81 for acute fatigue and 0.68 for inter-shift recovery (Javadpour et al. 2014). In this study, we assessed the structural validity and reliability of the scale. The overall Cronbach's alpha coefficient of the tool was 0.78, and for each subscale, it was calculated as follows: chronic fatigue, 0.82; acute fatigue, 0.77 and shift fatigue, 0.74. The OFER-15 scale has acceptable reliability and validity.

2.2.3 | Nurse Performance Instrument (NPI)

The NPI was designed and psychometrically evaluated by Barker and Nussbaum (2011) and consists of nine items. The subscales of this tool include physical aspects (Items 1, 4 and 8), mental aspects (Items 5 and 7) and general aspects (Items

2, 3, 6 and 9). Items 1, 2, 5, 7 and 9 are reverse scored. This tool is rated on a 6-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Higher scores indicate better performance with a total score of 9–54. Higher scores represent higher levels of performance. Barker and Nussbaum (2011) confirmed the validity and reliability of the NPI, reporting a Cronbach's alpha coefficient between 0.77 and 0.80. In this study, the Persian version of the NPI was used, which was validated by Estiri et al. (2021). In addition, we assessed the structural validity and reliability of the scale. The internal consistency of the entire tool was 0.87, with a range of 0.74–0.84 for the subscales.

2.2.4 | Hospital Survey on Patient Safety Culture (HSOPSC)

The HSOPSC was developed by the American Agency for Healthcare Research and Quality Hospital survey on patient safety culture in 2004. It comprises 42 items and 12 dimensions: 'frequency of events reported' (three items), 'overall perceptions of patient safety' (four items), 'supervisor/manager expectations and actions promoting patient safety' (four items), 'organisational learning' (three items), 'teamwork within units' (four items), 'teamwork across units' (four items), 'communication openness' (three items), 'feedback and communication about error' (three items), 'non-punitive response to the errors' (three items), 'staffing' (four items), 'handoffs and transitions' (four items) and 'management support for patient safety' (three items). Additionally, it contains two questions asking the respondents how to rate overall patient safety in their unit and how many cases they have mistakenly reported in the past 24 months. The items are rated on a 5-point Likert scale ranging from *strongly agree* to *strongly disagree* or *never* to *always*. The dimensions with a positive response of higher than 75 were considered as satisfactory and good, while the dimensions with an average response of less than 50 were regarded as a weak requiring intervention. Moreover, the dimensions between these two values were considered neutral (Sorra and Dyer 2010). We used the Persian version of the HSOPSC, which was validated by Moghri et al. (2012). Construct validity was assessed and verified via confirmatory factor analysis. The value of the goodness-of-fit index (GFI) of the model was 0.96, indicating the optimal fit of the model. The factor loading was reported as 0.39–0.87 for all the items except for items 15 and 17, indicating the appropriateness of the factor structure of the Persian version of the instrument. The total alpha coefficient of the HSOPSC was reported as 0.80 (Moghri et al. 2012). In this study, the structural validity and reliability of the scale were assessed. The internal consistency of the entire tool was 0.81.

2.3 | Ethical Considerations

This study was approved by the Ethics Committee of Shiraz University of Medical Sciences (approval no. IR.SUMS.REC.1041.049). The participants were informed that participation in the research was voluntary, and their names would not be disclosed to ensure the confidentiality of the information in the questionnaires. Furthermore, informed consent was obtained from the participants in accordance with the Declaration of Helsinki.

2.4 | Data Analysis

The participants' characteristics and major variables were analysed via descriptive statistics. Spearman correlation analysis was used to investigate the correlation between the variables. The data were analysed via SPSS version 22 at a significance level of $p < 0.05$. We used SEM via Smart-PLS software, version 3, to test the mediating effect of nurses' performance on the relationship between nurses' fatigue and patient safety culture, and to design a causal model.

SEM is a statistical method that can be applied easily in complex situations, and it can examine the relationships among a set of variables (including observed variables and latent variables) simultaneously. The observed variables (indicators) in such models are those that can be measured directly. Latent variables (dimensions) are not directly observed and are often inferred from other variables (Altindag and Genc 2015). In this method, when relationships among variables are examined, measurement error does not exist because the error is estimated and omitted. It is helpful in exploring or confirming the mechanism of the associations among variables, such as mediation and moderation effects (Hair et al. 2019; Kline 2023).

The Sobel test was used to confirm the mediating effect of nurses' performance on the relationship between nurses' fatigue and patient safety culture. For evaluating and confirming model fit, the following criteria were used: RMSEA (root mean square error of approximation, values < 0.08), CFI (comparative fit index, values > 0.9), GFI (values > 0.9) and AGFI (adjusted goodness-of-fit index, values > 0.9).

3 | Results

Out of the 308 collected questionnaires, 280 were analysed. Twenty-eight questionnaires were excluded from the study because of incomplete responses, resulting in a response rate of 90%. The participants had an average age of 33.84 ± 7.42 years and an average work experience of 8.60 ± 4.90 years. Additionally, the average number of patients per nurse per shift was 5.68 ± 1.17, and the average number of patients per ward was 18.65 ± 1.96. Table 1 shows the demographic characteristics of the participants.

The mean scores of the fatigue subscales were 21.91 ± 2.97, 17.83 ± 5.68 and 18.86 ± 3.45 for acute, chronic and inter-shift, respectively. The mean total score for overall fatigue was 58.61 ± 8.97. The results indicated that the nurses experienced moderate levels of fatigue. The mean scores of physical, mental, general and overall performance were 12.10 ± 2.59, 7.64 ± 2.32, 16.50 ± 2.96 and 36.23 ± 5.87, respectively. In terms of performance, the level of nurse performance was at a moderate level (mean value: 36.23), with the general aspect having the highest average and the mental aspect having the lowest average.

Among the dimensions of patient safety culture, the overall perception of patient safety had the highest mean score (3.54 ± 0.953), whereas the frequency of events reported had the lowest mean score (1.22 ± 2.38). The mean score of the patients' safety culture was approximately at a moderate level (2.49 ± 0.44).

Table 2 shows the correlations among the study variables, including nurses' fatigue, nurse's performance and patient safety culture. According to this table, nurses' fatigue had a significant and inverse relationship with their performance and patient safety culture ($p < 0.001$). Indeed, a direct relationship was shown between the nurses' performance and patient safety culture ($p = 0.008$).

TABLE 1 | Demographic characteristics of participants ($N = 280$).

Variables		Frequency (%)
Gender	Female	185 (66.1)
	Man	95 (33.9)
Marital status	Single	111 (39.6)
	Married	169 (60.4)
Education	Bachelor	237 (84.6)
	Master	43 (15.4)
Position	Nurse staff	218 (77.9)
	Head nurse	37 (13.2)
	Supervisor	25 (8.9)
Shift work	Fixed	128 (45.7)
	Rotating	152 (54.3)

TABLE 2 | Relationship between nurse's fatigue, nurse's performance and patient safety culture ($N = 280$).

Variables	1	2	3
1. Fatigue	1		
2. Nurse performance	−0.577[a]	1	
3. Patient safety culture	−0.296[a]	0.160[a]	1

[a]Spearman's correlation coefficient.

Table 3 shows the standardised regression coefficients of the direct and indirect path analyses of the research hypotheses. The p value of all standardised path coefficients was < 0.001, indicating that the relationships among explanatory variables, response variables and the mediating variable were significant. The results of the path 'nurse's fatigue to patient safety culture' revealed that the T value (critical value) (4.776) for this path was greater than 1.96. T values higher than 1.96 indicate hypothesis acceptance (Hair et al. 2019). Therefore, the effect of nurses' fatigue on patient safety culture was significant at the 95% level. Each unit of reduction in nurse fatigue improved patient safety culture by 0.286 units. The results of the path 'nurse performance to patient safety culture' revealed that the T value (6.901) for this path was greater than 1.96. Therefore, the effect of nurse performance on patient safety culture was significant at the 95% level. Each unit of improvement in the nurses' performance improved the patient safety culture by 0.360 units. Moreover, the path 'nurse's fatigue to nurse performance' was confirmed (t value =16.944). Given the t statistic, each one-unit increase in nurse fatigue could decrease nurses' performance by 0.860 units. There was a significant indirect effect between nurses' fatigue, nurses' performance and patient safety culture (t value = 0.309). This finding indicated that nurse performance mediated the relationship between nurses' fatigue and patient safety culture.

The results of the Sobel test ($Z = -7.011$) and the VAF statistic (0.872) confirmed the mediating role of nurses' performance in the relationship between nurses' fatigue and patient safety culture at the 95% confidence level. A total of 87.2% of the effect of fatigue on patient safety culture was explained indirectly through the mediating effect of nurse performance. Thus, nurse fatigue might not only directly affect patient safety culture but also exert a significant indirect effect on patient safety culture via nurse performance. Figure 1 shows the final research structural model, which reveals the associations between the dimensions of nurses' fatigue and patient safety culture with the mediating role of nurses' performance.

Table 4 shows the fit indices of the hypothesised model. The model fit of the mediating effect of nurse performance was satisfactory (GFI = 0.915, CFI = 89.9 and RMSEA = 0.048).

TABLE 3 | The standardised regression coefficients of the direct and indirect path analyses of research hypothesis.

Structural path	Hypothesis	Path coefficient (β)	T value (critical value)	p	Conclusion
Direct effects	Fatigue → patient safety culture	−0.286	4.776	≤0.001	Accepted
	Nurse performance → patient safety culture	0.360	6.901	≤0.001	Accepted
	Fatigue → nurse performance	−0.860	16.944	≤0.001	Accepted
Indirect effects	Fatigue → nurse performance → patient safety culture	0.309	−7.011	≤0.001	Accepted

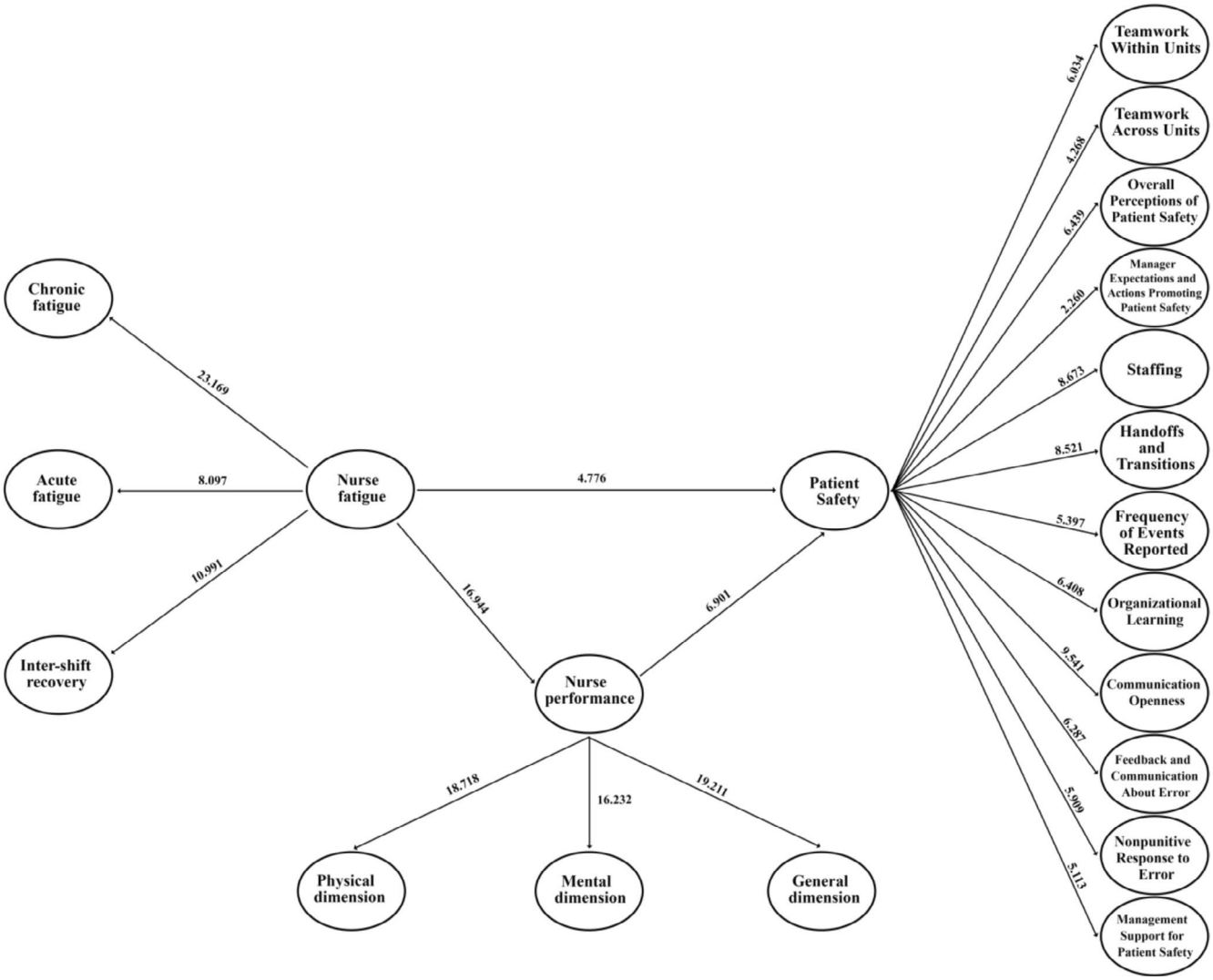

FIGURE 1 | Final research structural model.

4 | Discussion

Using SEM, the present study investigated the relationships among nurses' fatigue, nurses' performance and patient safety culture. The results showed that the overall level of fatigue among nurses was moderate. Using SEM, the present study investigated the relationships among nurses' fatigue, nurses' performance, and patient safety culture. The results revealed that the overall level of fatigue among nurses was 58.61 ± 8.97. Moreover, acute fatigue had the highest average score and chronic fatigue had the lowest average score. Given that the participants were mostly in the younger age group and had less than 10 years of average work experience, the lower incidence of chronic fatigue may be attributed to this. Alshammari et al. (2022) conducted a study on emergency nurses in eight hospitals in Saudi Arabia and reported that severe fatigue had the highest average, whereas chronic fatigue had the lowest average. Sagherian et al. (2023), in hospitals in the United States, reported higher rates of severe fatigue during the COVID-19 peak (Sagherian et al. 2023). The results of these two recent studies are consistent with those of the present study. Raesi et al. (2023) reported that chronic fatigue was more common in nurses during the COVID-19 outbreak (Raesi et al. 2023). These results are not consistent with the findings of the present study. To explain this finding, daily and during each shift, nurses may experience various forms of fatigue, which can be acute or chronic. Workload, working hours, the type of activity during the shift and many other factors, whether direct or indirect, such as organisational regulations governing hospitals and the nurse–patient ratio, can lead to different types of fatigue in nurses (Caboral-Stevens et al. 2023; Weinstein 2020). Therefore, this could be one of the reasons for this inconsistency.

TABLE 4 | Fit indices of the research model ($N = 280$).

GFI	Acceptable goodness of fit	Result
RMSEA	< 0.08	0.048
CFI	> 0.90	89.9
GFI	> 0.90	0.915
AGFI	> 0.90	0.908

Abbreviations: AGFI, adjusted goodness-of-fit index; CFI, comparative fit index; GFI, goodness-of-fit index; RMSEA, root mean square error of approximation.

In the present study, the average overall nurse performance score was moderate, with the general aspect having the highest average score and the mental aspect having the lowest average score. In this regard, Mehrnoosh et al. (2018) also assessed the performance level of nurses as moderate (Mehrnoosh et al. 2018). However, their study differed from the present study in terms of methodology because Mehrnoosh et al. solely evaluated the performance of nurses in enteral nutrition.

In contrast to the findings of the present study, Sagherian et al. (2018) reported a higher level of nurse performance. This inconsistency with the present study could be attributed to the research setting. Sagherian et al. examined 1000 nurses from various healthcare settings, including hospitals providing acute and emergency care, psychiatric centres, and teaching and general hospitals. Dyrbye et al. (2019) reported that most nurses reported high levels of nursing performance. These results are also not in line with the findings of the present study. The difference in the type of questionnaire used to assess nursing performance might be a possible reason for this variation. The study by Dyrbye et al. used the World Health Organisation Health and Work Performance Questionnaire (HPQ) to evaluate nursing performance. The questions in this questionnaire are general and applicable to all occupations. However, the NPI was used to assess performance in the present research. This questionnaire contains more specific items tailored for nurses.

Our results revealed that patient safety culture is at a moderate level. In a systematic review, Reis et al. (2018) reported that the dimensions of teamwork within the units and continuous improvement in organisational learning scored the highest. Ultimately, the researchers stated that patient safety culture was weak (Reis et al. 2018). Amarapathy et al. (2013) reported that management and leadership could be influential in enhancing patient safety culture, especially by institutionalising a non-punitive response to errors.

Tereanu et al. (2017) reported from Romania that the patient safety level, from the perspective of healthcare staff, was higher than the average level, with the highest positive response related to management support for patient safety. In a study conducted by Güneş et al. (2016) in Turkey on 554 nurses, more than 50% reported a good or excellent level of patient safety.

Studies conducted on patient safety culture have indicated that patient safety culture needs improvement. However, there are brief differences in the mean scores of various dimensions of patient safety culture from the employees' perspectives in different studies, which can be attributed to how the samples have completed the questionnaires or how the patient safety committee has operated in different hospitals. On the other hand, other factors contributing to this inconsistency may include the amount and variation in training provided to staff in the field of patient safety culture.

Path analysis of the research hypotheses revealed a significant inverse relationship between nurses' fatigue and their performance. Each one-unit increase in nurse fatigue could decrease nurses' performance by 0.860 units. In this context, Cho and Steege (2021) reported that nurse fatigue decreased performance. Furthermore, Poursadeqiyan et al. (2020) reported that safety culture deteriorates as work-related fatigue increases. Sagherian et al. (2017) reported that fatigue negatively affects nurses' performance. Knupp et al. (2018) also demonstrated that less fatigue increased nurses' capability and performance. These results are consistent with the findings of the current study. Indeed, the results of the path 'nurse fatigue to patient safety culture' revealed a significant and inverse relationship between fatigue and patient safety culture. Each unit of reduction in nurse fatigue improved patient safety culture by 0.286 units. Like our results, Ma'mari et al. (2020) reported a negative relationship between fatigue and patient safety culture. Furthermore, Wu et al. (2013) reported that nurses working more than 60 h per week in Japan and the United States had significantly lower patient safety culture scores than those working less than 40 h per week. Winters et al. (2021) also demonstrated that nurse fatigue is a growing concern and a potential threat to patient safety. These study results are considered consistent with the findings of the present study. Cho and Steege (2021) reported that nurse fatigue decreased patient safety, which is also in line with the results of the present study.

The results of this study indicated a suitable fit for the proposed structural model. The measured values of the fit indices were desirable, suggesting an appropriate fit for the structural model. The structural model confirmed the mediating effect of nurses' performance on the relationship between nurses' fatigue and patient safety culture. Approximately 87% of the total effect of nurses' fatigue on patient safety culture was explained indirectly through the mediating variable of nurse performance. This is a highly important finding, as it indicates that nursing performance acts as a mediator that can enhance the impact of nurses' fatigue on patients' safety culture. Understanding this mediating role can lead to the development of targeted interventions to improve patient safety culture while simultaneously focusing on nursing performance and fatigue. Furthermore, it provides researchers with a deeper understanding of the extent of the mediating effect, which can aid in designing interventions and strategies for enhancing patient safety culture. Rai et al. (2018) examined the mediating role of employee engagement and job enthusiasm in the relationship between rewards and recognition and between in-role and extra role performances. They reported that employee engagement and job enthusiasm mediated the impacts of rewards and recognition on in-role and extra role performances. Creating motivational conditions can also enhance individuals' performance (Rai et al. 2018). Zoromba and El-Gazar (2021) reported that nurses' job performance plays an intermediary role in the relationship between nurses' perceptions of nursing human resource practices and the excellent performance of hospitals. Finally, the findings confirmed that nurses' fatigue had both indirect and direct effects on patient safety culture through nurses' performance.

4.1 | Limitations

This study was conducted in internal-surgical wards, which could be considered a limitation. Another limitation of this research is the use of self-reporting tools. This data collection method can lead to reporting bias. Furthermore, this study was conducted in teaching hospitals, so caution should be exercised when generalising the results to non-teaching hospitals.

5 | Conclusion

This study supported the initial hypotheses. A significant relationship was found between work-related nurse fatigue, nurse performance and patient safety culture. Our results provide a theoretical model for future research, indicating that nurses' performance plays a significant role in relation to work-related fatigue and patient safety culture. Preventing work-related fatigue and consequences requires a multifaceted approach: nurse lifestyle modification, improved workplace culture that recognises the nurse's fatigue in nurse performance and patient safety to minimise it, and the implementation of organisational policies to solve this issue.

6 | Practice Implications

The research model can help nursing managers and healthcare policymakers consider practical strategies to moderate and minimise work-related nurse fatigue and subsequently improve patients' performance and safety.

Author Contributions

M.-S.M.N.: conceptualisation, methodology, investigation, data collection, validation, writing – original draft, writing – review and editing. Z.K.: conceptualisation, methodology, investigation, validation, writing – review and editing. M.R.: conceptualisation, methodology, investigation, validation, supervision, project administration, writing – review and editing.

Acknowledgements

This manuscript is a part of Monireh al-Sadat Mirahmadi Niri thesis for the Master of Science's degree in nursing. The researchers thank the Vice-Chancellor for Research and Technology at Shiraz University of Medical Sciences, Iran, for their financial support. They also extend their thanks to the participating nurses in this study.

Ethics Statement

This study was approved by the Ethics Committee of Shiraz University of Medical Sciences (IR.SUMS.REC.1401.049). Participants were informed that participation in the research was voluntary, and their names would not be disclosed to ensure the confidentiality of the information in the questionnaires. Furthermore, informed consent was obtained from the participants in accordance with the Declaration of Helsinki.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The datasets generated during and/or analysed during the current study are available from the corresponding author upon reasonable request.

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