Title: Nurses' and Patients' Perspectives on Missed Nursing Care in Hospitals Affiliated with Tabriz University of Medical Sciences

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Abstract

Background: Missed nursing care, defined as care that is either omitted or delayed, poses significant risks to patient safety. This study aims to compare the perspectives of patients and nurses on missed nursing care in medical-surgical wards of hospitals affiliated with Tabriz University of Medical Sciences, Iran, in 2024.

Methods: It was a descriptive-comparative cross-sectional study. A total of 167 nurses and 164 hospitalized patients were recruited by proportion to size random sampling and stratified convenience sampling, respectively. Data collection tools included demographic questionnaires and the Missed Nursing Care Survey (MISSCARE Survey). Data were analyzed using independent t-tests, Pearson correlation coefficient, and one-way ANOVA in SPSS. 21. A significance level of $p \leq 0.05$ was considered for all statistical analyses.

Results: The mean score of missed nursing care from the nurses' perspective was 1.92 ± 0.52, and from the patients' perspective, it was 2.32 ± 0.47. The most frequently missed care from the nurses' perspective included monitoring patients' eating and oral care, while from the patients' perspective, it included supervision of bathing and daily skin care. There was a significant difference between the perspectives of nurses and patients regarding the extent of missed care ($P < 0.001$), with patients perceiving a higher mean of missed care. There was a significant borderline relationship between the extent of missed care and the item of "Interest in Nursing Profession".

Conclusion: There are significant differences between the perspectives of patients and nurses regarding the extent of missed nursing care. Although nurses consistently ensured timely fluid intake monitoring and medication administration, they paid less attention to the important aspect of patients' hygiene. This suggests that nurses prioritize more visible tasks over patient-centered care. To improve the quality of nursing care, it is essential to incorporate both patients' and nurses' viewpoints regarding missed nursing care.

Keywords: Nurses' perspective, Patients' perspective, Delayed care, Missed Nursing Care, Quality of health care

Highlights

- Nurses' and patients' perspectives on missed care may differ significantly. However, no comprehensive study has addressed this issue in Iran.
- From the nurses' perspective, the most frequently missed care items were oral hygiene and dietary monitoring, whereas patients predominantly emphasized the importance of bathing and skin care.
- Nurses with higher professional engagement reported less missed care.
- Patients perceived the overall extent of missed care to be significantly higher than what nurses perceived.

Plain Language Summary

Missed nursing care occurs when nurses are unable to provide certain aspects of care, either delaying or skipping them entirely. This study compared the views of nurses and patients regarding missed care. The results showed significant differences in the nurses' and patients' perspectives, meaning that patients perceived higher extents of missed care. Nurses identified oral care and nutrition as the most frequently missed aspects of care, whereas patients perceived skin care and bathing as the most commonly missed care. Addressing these gaps by incorporating both nurses' and patients' viewpoints in care planning can improve healthcare quality and enhance patient satisfaction.

Introduction

Care is a fundamental need and the cornerstone of the nursing process (Toney-Butler and Thayer, 2023), aimed at assisting, supporting, and empowering patients. Nurses serve as the front line of care for patients (Hämel et al., 2022), ensuring that routine tasks are consistently performed. However, certain aspects of care may be overlooked despite adherence to standard procedures (Assadian et al., 2021).

The term "missed care" was first identified by Kalisch in 2006 (Kalisch and Williams, 2009) and refers to any aspect of patient care that is omitted or delayed (Kalisch and Xie, 2014). Kalisch's model, derived from a qualitative study on nursing process implementation, highlighted three predictive variables: labor resources, material resources, and communication. These factors play a pivotal role in ensuring proper care delivery. Additionally, individual attributes of nurses, such as beliefs and values, significantly influence whether nursing care is fully executed or missed (Kalisch, 2006).

Regarding the importance of addressing missed care, it should be noted that one of the fundamental rights of hospitalized patients is the assurance that their needs are met and that they receive comprehensive and safe care from the healthcare system. However, in certain conditions, due to various reasons such as staff shortages, some caregiving activities may be omitted or forgotten (Khajooee et al., 2019). Many hospitalized patients are put at risk due to missed care. Consequences such as falls, medication errors, hospital-acquired infections, pressure ulcers, gastrointestinal bleeding, increased pain and discomfort, and readmissions are cited as outcomes of missed care (Kalisch et al., 2012).

Evidence has shown that during every shift, some aspects of nursing care are missed by nurses (Karimi et al., 2021). Missed care often results in negative consequences for both nurses and organizations. At the individual level, nurses experience reduced job satisfaction, while at the organizational level, there is an increase in turnover, absenteeism, and resignations. Nurses have described their experiences with moral distress, role disruption, and feelings of frustration when faced with the inability to provide complete care for their patients (Kalisch et al., 2009; Kalisch, 2006, Stemmer et al., 2022; Arslan et al., 2022).

Numerous studies conducted in other countries around the world have examined the extent and types of missed nursing care from the nurses' perspective, as well as the consequences and factors leading to missed care (Papathanasiou et al., 2024; Willis et al., 2024; Mainz et al., 2024; Abere et al., 2024; Mandal and Seethalakshmi, 2023; Heng et al., 2023;Kalánková et al., 2020; Moreno-Monsiváis et al.; 2015, Gustafsson et al., 2020). Similarly, studies within Iran have investigated the extent and types of missed nursing care from the nurses' perspective, the associated factors, and nurses' experiences with missed care (Chegini et al., 2020; Janatolmakan and Khatony, 2022a; Babaei et al., 2024; Ghorbani et al., 2023; Rezaee et al., 2021; Amrolahi-Mishavan et al.; 2022, Rahmani et al., 2022; Rezaei-Shahsavarloo et al., 2021; Janatolmakan and Khatony, 2022b).

The results regarding the extent, types, and causes of missed care vary across different studies in the country. For example, a 2021 study in Ardabil province reported that from the nurses' perspective, the most missed care involved turning patients every two hours and measuring vital

signs (Ebadi et al., 2021). A study in Urmia province, identified patients' emergency conditions, the insufficient number of nursing assistants, and an unexpected increase in the number of patients as contributing factors to missed nursing care (Rezaee et al., 2019). While most studies have focused on nurses' perspectives, it raises the question of whether patients' perspectives on missed care are equally important. A scoping review emphasized that since patients actively participate in their care, understanding their perspectives on care that is either inadequately performed or entirely omitted is crucial and constitutes a fundamental aspect of their rights (Gustafsson et al., 2020), especially because studies have shown that missed care occurs more frequently among patients with lower levels of consciousness or those who are critically ill (Kalisch et al., 2014; Cho et al., 2017; Orique et al., 2017).

However, studies evaluating the extent, types, and causes of missed care from patients' perspectives are very limited. Given that nurses' and patients' perspectives on missed care may differ (Gustafsson et al., 2020), comparing these viewpoints is essential. Such comparisons can reveal discrepancies and highlight areas needing improvement.

Despite the importance of this comparison, no comprehensive study has addressed this topic in Iran. Most existing studies have focused solely on nurses' perspectives (Karimi et al., 2021; Rezaee et al., 2021; Ebadi et al., 2021; Yaghoubi et al., 2019), potentially overlooking critical aspects of care deemed important by patients. Therefore, this study aims to bridge this gap by comparing the perspectives of nurses and patients on missed nursing care in medical-surgical wards. The findings are expected to provide valuable insights that can enhance the quality of care in medical-surgical departments.

Materials and Methods

Design, setting, and sample

This descriptive comparative cross-sectional study was conducted in the medical-surgical departments of seven teaching hospitals affiliated with Tabriz University of Medical Sciences (Imam Reza, Sina, Shohada, Nikookari, Alzahra, Taleghani, and Alavi) in 2024.

The sample size was determined using a similar study that compared the perspectives of nurses and patients on missed care (Moreno-Monsiváis et al., 2015). Based on the reported means and standard deviations from that study, with a power of 80% and a confidence level of 95%, the sample size for both nurses and patients was calculated to be 154 each. Taking into account a 10% sample attrition for incomplete or invalid questionnaires, this number was increased to 172 per group. Due to the elimination of incomplete questionnaires, data from 167 nurses and 164 patients were finally analyzed.

Nurses were selected using proportionate stratified random sampling based on population size. The sample size was allocated to each hospital department based on the number of nurses working there, and the desired sample was randomly selected from the list of nurses in each department. For patients, a stratified convenience sampling method was also employed. By estimating the

number of hospitalized patients in each department, a sample size proportional to this number was allocated to each department. During sampling, the desired sample was selected from among the hospitalized patients who met the inclusion criteria.

Inclusion and exclusion criteria

The inclusion criteria for nurses were as follows: holding a bachelor's degree or higher, having at least six months of work experience in medical-surgical departments, being employed in these departments at the time of data collection, and not having concurrent responsibilities in other units (to maintain stability in the study population).

The inclusion criteria for patients were: age over 18 years, at least 48 hours had passed since hospitalization in the medical-surgical department, no known cognitive or psychiatric disorders (Gharaeipour and Andrew, 2013), awareness of time and place, which is determined by obtaining a minimum score of 24 on the Mini-Mental State Examination (MMSE); a questionnaire with open questions to assess a person's mental state and memory in dimensions such as orientation to time and place, attention, and recall (Gharaeipour and Andrew, 2013). Incomplete questionnaires were discarded in both groups.

Data Collection

Data were collected by the first author from February to June 2024. To collect data from nurses who met the inclusion criteria, the researcher visited the relevant departments during different shifts and explained the objectives and procedures of the study. The time for completing the questionnaire was determined by the nurses (e.g., during break or breakfast). Regarding data collection from eligible patients, after explaining the objectives of the study, the questions and options were read aloud to illiterate patients and their responses were recorded in the questionnaire. Patients were asked to complete the questionnaires when they were comfortable and relatively calm. To ensure the accuracy of the data collected, the researchers emphasized their commitment to confidentiality and data protection.

Instruments

Data were collected from nurses and patients using demographic questionnaires and Missed Nursing Care Survey (MISSCARE Survey)

The ***Nurses' Demographic Questionnaire*** included items on age, gender, marital status, education level, employment status, hospital and department of employment, years of hospital experience, years of experience in medical- surgical departments, interest in the nursing profession, and work schedule details such as the number and type of shifts. The ***Patients' Demographic Questionnaire*** gathered information on age, gender, marital status, number of children, education level, residence status (local/non-local), hospitalization history, length of hospital stays, and department of admission. While the basic structure of these questionnaires was derived from Kalisch's scale, modifications were made-particularly for patients-to better align with the study objectives.

The ***Missed Nursing Care Survey (MISSCARE Survey)***, developed by Kalisch & Williams (2009) and was psychometrically evaluated in 2009 (Kalisch & Williams, 2009). This questionnaire is used to assess the frequency of missed nursing care activities and its contributing factors. Each section can be used independently (Khajooee et al., 2019). In this study, we employed only the section evaluating missed nursing care.

The original version demonstrated high reliability with a Cronbach's alpha of 0.94 (Kalisch & Williams, 2009). The Persian version of the questionnaire that was validated by Khajooee et al. (2019), demonstrated strong psychometric properties, with a Cronbach's alpha of 0.91.

The section of measuring missed nursing care consists of 24 items. Responses are rated on a Likert scale from 1 to 5, where higher scores indicate a greater frequency of missed nursing care (Khajooee et al., 2019), The modifications in this study, similar to the study conducted in Mexico (Moreno-Monsiváis et al., 2015), were limited to the inclusion of parenthetical examples to facilitate patients' understanding. For example, vital signs were added as " e.g., blood pressure, fever, etc.". After adding examples, the validity of the questionnaire was confirmed by 10 faculty members of Tabriz University of Medical Sciences, and its Cronbach's alpha was estimated to be 0.91.

Data Analysis

The collected data were analyzed using SPSS version 21. The Kolmogorov-Smirnov normality test was performed, and the results were not statistically significant ($p > 0.05$), indicating that the distribution of the variables could be considered normal. For describing the quantitative data, mean and standard deviation were used. The mean scores for the perspectives of patients and nurses were estimated both pointwise and with a 95% confidence interval. Additionally, the mean scores converted to a 1 to 5 scale, and analyzed using the independent t-test, Pearson correlation coefficient, and one -way Analysis of Variance (ANOVA). Significance level was set at $p \leq 0.05$ for all tests.

Results

The study results showed that the majority of participating nurses were female (56.9%), married (53.3%), and held a bachelor's degree (85.6%). The average age of the nurses was 30.03 ± 4.90 years. The average age of the patients was 50.89 ± 19.27 years, including 65 men (38.5%) and 99 women (58.6%) (Table 1).

In the present study, a borderline statistically significant association was observed between interest in the nursing profession and the extent of missed care (P=0.05). However, no statistically significant relationships were found between missed care and other demographic variables, whether pertaining to nurses or patients ($P > 0.05$).

The overall mean score for missed nursing care was 1.92 ± 0.52 from nurses' perspective and 2.32 ± 0.47 from patients' perspective. From the nurses' perspective, the two most frequently missed care items, as indicated by the highest mean scores, were: "Supervision or assistance with oral hygiene" (3.06 ± 1.07) and "Nurse supervision of the eating habits of all patients" (3.06 ± 1.07). From the patients' perspective, the two highest mean scores were "supervision of bathing or daily skin care (e.g., hand and face washing)" (3.59 ± 1.35) and "supervision or assistance with oral hygiene" (3.34 ± 1.33). (Table 2).

The lowest mean score from the nurses' perspective was related to the item "Inquiring about fluid intake (e.g., tea, water) and urinary function" (1.30 ± 0.54), and from the patients' perspective it was related to the item "Administration of medications regularly and daily" (1.48 ± 0.73) (Table 2). There was a statistically significant difference between the extent of missed care perceived by patients and nurses (Table 3, $P < 0.001$), indicating that patients perceived a greater extent of missed nursing care (Table 3).

Table 1 - Socio-demographic characteristics of participating nurses and patients

Nurses				Patients			
Variable	**Category**	**N**	**(%)**	**Variable**	**Category**	**N)**	**(%)**
Gender	Male	72	43.1	**Gender**	Female	65	39.6
	Female	95	56.9		Male	99	60.4
Education Level	Bachelor's Degree	143	85.6	**Education Level**	Illiterate	57	34.8
	Master's Degree	24	14.4		Less than High School	55	33.5
					High School Diploma	31	18.9
Employment Status	Official	58	34.7		Bachelor's Degree	19	11.6
	Contract	62	37.1				
	Temporary	3	1.8		Above Bachelor's Degree	2	1.2
	Project	44	26.3	**length of hospitalization**	2 days	42	25.6
Interest in Nursing Profession	High	30	18.		More than 2 days	122	74.4
	Medium	66	39.5	**Place of Residence**	Local	85	51.8
	Low	45	26.9		Non-local	79	48.2
	Indifferent	26	15.6	**Hospital Ward**	Surgery	115	70.1
Shift Type	Fixed	14	8.4		Internal Medicine	49	29.9
	Rotating	153	91.6	**Previous Hospitalization Experience**	Yes	97	59.1
Monthly Shifts	None	20	12.0		No	67	40.9
	1-2 days	56	33.5	**Quantitative Variables**		**Mean ± SD**	
	3-4 days	66	39.5	Age (years)		**50.88±19.29**	
	More than 4 days	25	15.0				
Department Type	Surgery	119	71.3				
	Medical	48	28.7				
Quantitative Variables		**Mean ± SD**					
Age (years)		30.03 ± 4.90					
Years of Hospital Experience		6.07 ± 4.69					
Years of Department Experience		4.41 ± 3.48					

Table 2. Extent of Missed Nursing Care items from the Patients' and Nurses' Perspectives

No.	Items	Mean ± SD	Mean ± SD
		Patients	Nurses
1	Encouragement or assistance with walking, three times a day or at specified times	2.10 ± 1.02	1.80 ± 0.65
2	Recommendations for changing bed position or assisting with regular patient turning	2.22 ± 1.02	1.75 ± 0.70
3	Nurse supervision of timely meal distribution to patients (before cooling)	2.92 ± 1.18	2.76 ± 0.92
4	Nurse supervision of the eating habits of all patients	2.98 ± 1.17	3.06 ± 1.07
5	Administration of medications regularly and daily	1.48 ± 0.73	1.56 ± 0.62
6	Daily measurement of vital signs (e.g., blood pressure, fever, etc.)	1.59 ± 0.83	1.38 ± 0.54
7	Inquiring about fluid intake (e.g., tea, water) and urinary function	2.05 ± 1.03	1.30 ± 0.54
8	Accurate documentation of health-related responses (e.g., pain) in the patient's record	2.31 ± 1.00	1.37 ± 0.58
9	Education about the illness, medication side effects, and diagnostic tests	2.60 ± 1.05	1.83 ± 0.69
10	Emotional support for patients and their families during hospital stays	2.24 ± 1.18	1.86 ± 0.80
11	Supervision of bathing or daily skin care (e.g., hand and face washing)	3.59 ± 1.35	3.00 ± 1.17
12	Supervision or assistance with oral hygiene (e.g., brushing teeth)	3.34 ± 1.33	3.06 ± 1.07
13	Handwashing before providing care	1.76 ± 0.90	1.51 ± 0.63
14	Patient education during hospital stays or upon discharge	2.04 ± 0.89	1.59 ± 0.67
15	Blood sugar monitoring with a glucometer (if the patient has high blood sugar)	1.55 ± 0.84	1.41 ± 0.51
16	Asking about health-related issues (e.g., pain) in each shift	2.37 ± 0.96	1.47 ± 0.58
17	Regular assessment of health improvement (e.g., constipation relief)	2.43 ± 0.94	1.56 ± 0.61
18	Evaluation and care of intravenous catheters (e.g., angiocatheter)	1.53 ± 0.77	1.34 ± 0.51
19	Responding to patient call bells within five minutes	2.20 ± 1.03	1.60 ± 0.68
20	Administration of needed medications (e.g., painkillers) within 15 minutes of request	2.71 ± 2.72	1.81 ± 0.70

21	Evaluation of medication effects (e.g., pain reduction after analgesic)	2.48 ± 0.94	1.84 ± 0.77
22	Providing satisfactory answers to patient questions in various medical fields	2.78 ± 1.21	3.00 ± 1.19
23	Assisting or supervising toilet visits for immobile patients	2.60 ± 1.21	2.66 ± 1.06
24	Wound care if present (e.g., dressing)	1.75 ± 0.80	1.51 ± 0.58
	Overall Score	2.32 ± 0.47	1.92 ± 0.52

Table 3: Comparison of the Extent of Missed Nursing Care from the Perspectives of Nurses and Patients

Missed Care	M (SD)	Statistical Test
Nurses	(1.92 ± 0.52)	t = -7.19
Patients	(2.32 ± 0.47)	df = 329 P < 0.001

Discussion

This study highlights a significant difference between patients' and nurses' perceptions of missed nursing care. From the nurses' perspective, the most frequently missed care items were monitoring or assisting with patients' oral hygiene and supervising their dietary habits. From the patients' perspective, supervision of bathing or daily skin care was reported as the most frequently missed care, followed closely by supervision or assistance with oral hygiene—the latter aligning with nurses' perceptions. Nurses, given resource constraints and their clinical responsibilities tend to focus on physiologically essential tasks—such as assessing fluid intake, urinary function, daily measurement of vital signs, pain, and providing care for intravenous catheters. In contrast, patients who experience care up close prioritize comfort and basic hygiene needs, with bathing and skin cleanliness being cited as their most important concerns (Endalamaw et al., 2024). These discrepancies underscore the necessity of a patient-centered framework that aligns clinical standards with patient-defined values to ensure comprehensive and holistic nursing care.

In the study by Kalisch et al., oral care also received the highest average score in terms of missed care from the nurses' perspective (Kalisch et al., 2011). Hillary and colleagues argue that nurses in internal-surgical units are in a position to influence oral care outcomes and reduce related diseases, and this can be achieved through proper staff training (Jenson et al., 2018). Initially, it might seem that overlooking this care isn't critical, but it is important to remember that oral infections can spread to other parts of the body. Additionally, poor oral hygiene affects patients' appetite and willingness to eat (Rajasekaran et al., 2024). Neglecting this care during hospitalization can lead to dental decay or gum infections, resulting in additional dental costs post-discharge. Therefore, educating nurses on the importance of routine oral care could reduce instances of this type of missed care at the bedside.

Modern studies indicate that daily bathing significantly reduces infection rates (Reynolds et al., 2021). Bathing not only helps maintain patient hygiene but also reduces body odor, stimulates blood circulation, and enhances patient comfort and relaxation. Additionally, bathing provides nurses with the opportunity to inspect patients' skin and identify potential problems early. However, patient bathing in hospital settings might be overlooked or inadequately performed (Abbas and Sastry, 2016; Tai et al., 2021). Factors such as staff shortages, high workload, and lack of coordination among healthcare teams can contribute to neglecting this crucial care (Moreno-Monsiváis et al., 2015).

The findings of our study showed that patients have perceived the extent of missed care as moderate, with a higher percentage of care being missed compared to nurses' views. In other words, nurses in this study perceived the overall extent of missed care as notably lower than patients did. Some other studies also indicate that missed nursing care has been perceived as moderate from the nurses' perspective (Karadaş et al., 2024; Mainz et al., 2024; Abere et al., 2024; Mandal and Seethalakshmi, 2023; Heng et al., 2023; Kalánková et al., 2020; Gustafsson et al., 2020; Moreno-Monsiváis et al., 2015).

The difference between nurses' and patients' perceptions regarding missed care and its higher perception by patients warrants careful analysis. We propose three interrelated explanations rooted in systemic challenges: First, chronic nursing shortages compel task triage, relegating "non-urgent" hygiene care despite its profound impact on patient dignity and infection risk (Papathanasiou et al., 2024). Second, supervisory practices disproportionately emphasize visible, technical tasks (e.g., medication administration, wound care) while overlooking holistic processes like bathing or emotional support (Southard, 2024). This "surveillance bias" implicitly signals that non-technical care is expendable (Moreno-Monsiváis et al., 2015). Third, concurrent employment across hospitals induces fatigue, further narrowing focus to checklist-driven tasks at the expense of holistic care (Abbaszadeh et al., 2025). Consequently, nurses lower missed-care ratings reflect adaptation to institutional constraints that normalize omissions of "low-priority" hygiene interventions. The specific missed care items also reflect these systemic pressures. Nurses' emphasis on the omission of oral care aligns with global patterns (Kalisch and Xie, 2014); its neglect—though often perceived as non-urgent—predisposes patients to systemic infections, malnutrition, and post-discharge dental morbidity (Rajasekaran et al., 2024). Conversely, patients' emphasis on bathing/skin care omissions highlights a critical dignity deficit. Bathing transcends hygiene; it embodies comfort, promotes circulation, enables skin assessment, and reduces hospital-acquired infections (Reynolds et al., 2021). That patients rated overall missed care as moderate—significantly higher than nurses—reflects their heightened sensitivity to omissions impacting well-being and autonomy, while nurses may normalize compromises due to resource constraints (Maghsoud et al., 2022).

Regarding demographic variables, there was a borderline statistical relationship between nurses' professional interest and the extent of missed care with greater engagement correlating with lower missed care. This suggests that intrinsic motivation may help mitigate missed nursing care (Srulovici and Yanovich, 2022), reinforcing the importance of nurturing professional engagement through autonomy, recognition, and supportive supervision to enhance care quality (Delima et al.,

2024). To improve the quality of nursing care, it is essential to consider both patients' and nurses' perspectives simultaneously as previous studies have emphasized this point (Karadaş et al., 2024; Mainz et al., 2024; Abere et al., 2024; Mandal and Seethalakshmi, 2023; Heng et al., 2023; Kalánková et al., 2020; Gustafsson et al., 2020; Moreno-Monsiváis et al., 2015). Such an approach may enhance patient satisfaction and alleviate workload-related challenges for nurses.

This study is subject to the inherent limitations of cross-sectional studies that prevent the establishment of causal relationships. Furthermore, self-reported data may not always accurately reflect reality, as responses can be influenced by various factors such as recall bias, subjective interpretation, or response tendencies.

Conclusion

This study showed significant differences between the perspectives of patients and nurses regarding missed nursing care. The findings indicated that the most frequently missed care from the nurses' perspective included monitoring patients' eating habits and oral care, while patients highlighted supervision of bathing and daily skin care. These differences suggest that improving nursing care quality requires considering the views of both groups. Further studies in this field can help to more accurately identify missed care and provide appropriate solutions to improve the quality of care. It is also recommended to use the second part of the questionnaire to identify factors affecting missed care.

Ethical Considerations

Compliance with ethical guidelines

This research is derived from a Master's thesis in internal-surgical nursing, approved by the Ethics Committee of Tabriz University of Medical Sciences (ethics ID: IR.TBZMED.REC.1402.612). The study adhered to accepted ethical standards, as stated in the Helsinki Declaration. Participants were informed of the study's purpose, and written informed consent was obtained.

Authors' contributions

Conceptualization: Jabbarzadeh F., Khalkhali M.; Methodology and analysis: Khalkhali M., Sarbakhsh P.; Supervision and project administration: Jabbarzadeh F., Seyedrasooli A.; Data collection and writing the initial draft: Khalkhali M. Critical Review and editing: Jabbarzadeh F., Khajehgoodari M.; Final Approval: All authors.

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