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# Unveiling missed nursing care: a comprehensive examination of neglected responsibilities and practice environment challenges

Somayeh Babaei<sup>1</sup>, Kourosh Amini<sup>2\*</sup>  and Farhad Ramezani-Badr<sup>3</sup>

## Abstract

**Background** The global variable of missed nursing care and practice environment are widely recognized as two crucial contextual factors that significantly impact the quality of nursing care. This study assessed the current status of missed nursing care and the characteristics of the nursing practice environment in Iran. Additionally, this study aimed to explore the relationship between these two variables.

**Methods** We conducted an across-sectional study from May 2021 to January 2022 in which we investigated 255 nurses. We utilized the Missed Nursing Care Survey, the Nursing Work Index-Practice Environment Scale, and a demographic questionnaire to gather the necessary information. We used the Shapiro–Wilk test, Pearson correlation coefficient test, and multiple linear regression test in SPSS version 20 for the data analyses.

**Results** According to the present study, 41% of nurses regularly or often overlooked certain aspects of care, resulting in an average score of  $32.34 \pm 7.43$  for missed nursing care. It is worth noting that attending patient care conferences, providing patient bathing and skin care, and assisting with toileting needs were all significant factors contributing to the score. The overall practice environment was unfavorable, with a mean score of  $2.25 \pm 0.51$ . Interestingly, 'nursing foundations for quality of care' was identified as the sole predictor of missed nursing care, with a  $\beta$  value of  $-0.22$  and a  $p$ -value of  $0.036$ .

**Conclusions** This study identified attending patient care interdisciplinary team meetings and delivering basic care promptly as the most prevalent instances of missed nursing care. Unfortunately, the surveyed hospitals exhibited an undesirable practice environment, which correlated with a higher incidence of missed nursing care. These findings highlight the crucial impact of nurses' practice environment on care delivery. Addressing the challenges in the practice environment is essential for reducing instances of missed care, improving patient outcomes, and enhancing overall healthcare quality.

**Keywords** Care quality, Missed care, Nursing, Practice environment

\*Correspondence:

Kourosh Amini  
korosh@zums.ac.ir

<sup>1</sup>Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Zanzan University of Medical Sciences, Zanzan, Iran

<sup>2</sup>Department of Psychiatric Nursing, School of Nursing and Midwifery, Zanzan University of Medical Sciences, Mahdavi St., Zanzan 4515789589, Iran

<sup>3</sup>Department of Critical Care Nursing, School of Nursing and Midwifery, Zanzan University of Medical Sciences, Zanzan, Iran



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## Introduction

Missed Nursing Care (MNC) is the failure to provide any necessary aspect of patient care, partially or entirely, or delay in delivering it [1]. MNCs can have severe side effects on patients, including safety threats [2] and even mortality [3]. It also significantly decreases the quality of nursing care [4]. MNC can also have adverse and destructive effects on nurses, including decreased job satisfaction, increased absenteeism, and the intention to leave their jobs [5]. As a result, MNCs have become a key focus of nursing researchers in recent years and are widely recognized as a significant global problem [6].

A literature review revealed that MNCs are multidimensional and vary significantly in frequency and elements across different research communities [7]. In Iran, information regarding MNCs is limited. According to our search, only one reliable study [8] has been conducted on this topic in the last five years. Chegini et al. conducted a study that showed that the percentage of participants who missed care was 72.1%. The most common tasks of missed nursing care included patient discharge planning and teaching, emotional support for patients and their families, interdisciplinary care conferences, and patient education regarding their illness, tests, and diagnostic procedures. Although the study by Chegini et al. has provided valuable information, the generalizability of its results is limited due to its small sample size. The study included nurses from only medical-surgical wards and used the census sampling method.

MNC is influenced by various individual and organizational factors [9]. In a systematic review, Chiappinotto et al. identified significant factors contributing to MNC, such as low nurse-to-patient ratios, high workloads, and poor work environments. Moreover, stress, job dissatisfaction, and inadequate education among nurses were recognized as crucial elements. Furthermore, patient clinical instability was found to further worsen MNC [10]. However, some researchers argue that organizational and environmental factors are more influential in causing MNC than individual factors [11].

Another influential organizational variable on nursing performance is the practice environment (PE) [12]. PE in nursing is inclusive of material and human resources, a cooperative environment, and other elements related to the environment that directly or indirectly affect how care is provided [13]. PE is involved in nurses' burnout [14], job satisfaction, stay in nursing [15], and overall quality of nursing care [16]. Like in MNCs, evidence suggests that PE varies across different hospitals and wards within a hospital [17]. For instance, a study conducted by Choi & Boyle in the U.S. demonstrated that pediatric wards had more favorable PEs than did medical-surgical wards. However, previous studies have shown that MNCs differ across poor, moderate, and suitable PEs. Weak PE

has been found to increase MNCs [18], while optimal PE reduces MNCs [17]. Due to the global significance of MNCs and PEs for quality of care and the variability of these two variables due to different sociocultural factors, it is essential to understand the weaknesses of MNCs and PEs in every community thoroughly. Therefore, this study aimed to determine the status of MNCs, the characteristics of PEs, and the relationships between these two variables among nurses working in two teaching hospitals.

## Methods

The present study was cross-sectional from May 30, 2021, to January 19, 2022. The study was conducted according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines. The study included nurses employed in the medical-surgical, emergency, and intensive care units of two major teaching hospitals in Zanjan Province. This province is situated in the northwestern region of Iran and has a population of approximately 1,016,000 people. To be eligible for participation in the study, the nurses needed to meet the following specific inclusion criteria:

1. A minimum of three months of work experience in the desired ward.
2. Holding a bachelor's degree or higher.
3. Consent to participate in the study was obtained.

We utilized Formula 1 for a finite population to determine the sample size. The values used in this formula were  $N$  (total population)=553, power (the probability of correctly rejecting the null hypothesis)=0.80, standard deviation (SD)=13.97,  $d$  (margin of error or precision)=1.2, and  $Z$  (standardized value for the corresponding level of confidence)=1.96. The formula indicated that a minimum sample size of 246 was required based on these variables. During the research, we found that a recent study comparable to our work was conducted by Park et al. [18]. For our research, we utilized the standard deviation of the variables in Formula 1. Their study recorded the mean and standard deviation of the MNC and PE as  $84.06 \pm 13.79$  and  $2.92 \pm 0.25$ , respectively. We included the higher standard deviation (related to MNCs) to ensure a larger sample size. We prepared 270 questionnaires and distributed them among the selected nurses. We also considered the possibility of spoiled questionnaires and distributed extra questionnaires accordingly. Fifteen questionnaires were excluded from the study due to incomplete data, leaving a total of 255 questionnaires that were used for data analysis out of the 270 that were distributed.

$$n = \frac{NZ^2S^2}{Nd^2 + Z^2S^2} \quad (1)$$

We utilized a systematic random method to select the nurses for the study. In the first step, a list of nurses working in the desired wards was taken, and the sampling frame was prepared. In the second step, each nurse was assigned a number from a table of random numbers. This process generated a new sampling frame. In the third step, we calculated the distance between the study samples, denoted as 'K', using the formula  $K=N/n$ . We computed K by dividing the total population (N) of 553 by the sample size (n) of 270, approximately 2. To select the participants, we utilized a systematic random method. A new sampling frame was generated in the first step, as described earlier. The first nurse was selected randomly from this new sampling frame, and the subsequent samples were taken at a distance of two people from the previous nurse.

To collect the data, we used three different questionnaires: (a) a demographic profile form, (b) the Missed Nursing Care (MISSCARE) Survey, and (c) the Nursing Work Index-Practice Environment Scale (NWI-PES). The demographic profile included various variables, including sex, age, marital status, educational degree, work experience, position, shift work, employment type, and ward type.

In this study, we utilized the MISSCARE survey (MISSED) to assess MNC. We chose the MISSED based on its extensive utilization and strong psychometric properties, as evidenced in the literature. As noted by Chiappinotto et al. [10], 34 out of the 58 studies reviewed utilized a version of the MISSCARE survey, highlighting its reliability and validity in assessing MNC. The MISSCARE Survey consists of two parts: Part 'A' and Part 'B'. Part 'A' included the most missed care components, while Part 'B' included the reasons for missing nursing care. We utilized part 'A' of the questionnaire, which constituted 24 items of the MISSCARE Survey. Each of the 24 items comprises five answer options: 1) rarely or never missed, 2) occasionally missed, 3) frequently missed, 4) always missed, and 5) nonapplicable. Kalisch & Williams included the option of 'nonapplicable' to account for nurses who operate in situations where certain care activities may not be performed [19]. The total score range of this survey is 24–96, where higher scores indicate a greater probability of missed care. In line with the findings of a previous study [17], we considered the combination of "frequently missed" and "always missed" options as missed care to demonstrate the frequency of missed nursing care. The MISSCARE Survey has undergone psychometric analysis, and its applicability has been approved for the nursing community in Iran [20]. The internal consistency of the tool was measured based on Cronbach's alpha coefficient ( $\alpha=0.88$ ) in this study.

The psychometric analysis of the NWI-PES has been conducted, and its usage has been approved

[21]. Developed by Lake in 2002 and authorized by the National Quality Forum (NQF), this scale comprises thirty-one items and operates on a four-point Likert scale, with scores ranging from four to one. The response options were strongly agree=4, somewhat agree=3, somewhat disagree=2, and strongly disagree=1. According to [22], the possible score range of the whole scale and its subscales is one to four. The NWI-PES comprises five subscales:

The nurses' participation in hospital affairs was evaluated with nine items.

'Staffing and resource adequacy', which includes four items.

The three items used were "Collegial nurse-physician relations".

'Nursing foundations for quality of care' with ten items.

The five items asked about nurses' ability, leadership, and support.

A scale midpoint greater than 2.5 is considered an acceptable PE [22]. The NWI-PES demonstrated high internal consistency, with a Cronbach's alpha of 0.93. The Cronbach's alpha for each of the subscales of the NWI-PES was computed. The results were as follows: 'nurse participation in hospital affairs,'  $\alpha=0.88$ ; 'nursing foundations for quality-of-care,'  $\alpha=0.72$ ; 'staffing and resource adequacy,'  $\alpha=0.87$ ; 'collegial nurse-physician relations,'  $\alpha=0.90$ ; and 'nurse manager ability, leadership, and support of nurses,'  $\alpha=0.84$ .

We computed the means and standard deviations of the MNC and PE scores and utilized the Shapiro-Wilk test to determine the normality of the data distribution. The results revealed that the data followed a normal distribution. We employed the Pearson correlation coefficient to determine the correlation between PEs and MNCs. Furthermore, we conducted a multiple linear regression test to examine whether changes in the MNC score, as the dependent variable, were associated with changes in the PE subscale scores. Before conducting the multiple linear regression analysis, we confirmed that the assumptions were met and evaluated. We confirmed the assumption of independent errors by using the Durbin-Watson test. Homoscedasticity and linearity assumptions were assessed through P-P plots. The hypothesis of multicollinearity was examined by determining the variance inflation factor (VIF) and tolerance [23]. The VIF ranged from 1.006 (TOL=0.99) for 'collegial nurse-physician relations' to 1.04 (TOL=0.96) for 'nursing foundations for quality-of-care.' Independent t tests and ANOVA were used to evaluate the associations between demographic variables and MNCs. The statistical analysis of the data was conducted using SPSS software version 24, and a Pvalue lower than 0.05 was used to indicate statistical significance.

## Results

### Participants' characteristics

The majority of the participants were females (84.3%), were married (68.2%), and were employed on a 5-year contract (46.7%). The majority of the participants were females (84.3%), were married (68.2%), and were employed on a 5-year contract (46.7%).

In addition, almost all of the participants (95.7%) had a Bachelor of Science in Nursing (BSN) degree, and a significant proportion (45.8%) worked in medical-surgical wards. Most of the respondents (91.4%) were staff nurses, and 89.8% of them worked in rotational shift work. The.

The participants' average age and work experience were  $33.94 \pm 7.40$  and  $9.25 \pm 7.14$ , respectively (Table 1).

### Missed nursing care

The overall mean score for MNCs, with a score ranging from 24 to 96, was  $32.34 \pm 7.43$ . Of the total nurses, 41% reported that they always or frequently missed at least one aspect of nursing care. Based on the findings, the items with the highest mean score in descending order were attending an interdisciplinary patient care conference, patient bathing or skin care, assisting with toileting needs within 5 min of request, mouth care, and feeding the patient when the food was still warm (Table 2).

The mean MNC score was significantly greater for male nurses than for female nurses ( $X_1 = 36.25$ ,  $X_2 = 31.56$ ;

$t = -3.738$ ,  $p < 0.001$ ). Other demographic and occupational variables of the nurses, such as age, marital status, degree, work experience, position, rotational shift work, type of employment, and working place, had no significant association with MNCs ( $p > 0.05$ ).

### Practice environment characteristics

The overall mean score for PE was  $2.25 \pm 0.51$ . Among the different subscales of the PE scale, the highest mean score was observed for 'collegial nurse-physician relations' ( $M = 2.45$ ,  $SD = 0.72$ ). Furthermore, the mean scores for "nursing foundations for quality of care," "nurse manager ability, leadership, and support of nurses", and "nurse participation in hospital affairs" were  $2.43 \pm 0.58$ ,  $2.23 \pm 0.65$ , and  $2.16 \pm 0.58$ , respectively. The lowest mean score was observed for 'staffing and resource adequacy' ( $M = 1.81$ ,  $SD = 0.64$ ).

### Correlations between practice environment characteristics and missed care

The study's results indicate a significant and negative correlation between the mean score of PEs and the overall mean score of MNCs ( $r = -0.18$ ,  $p = 0.002$ ). There was a strong link between the overall mean score of MNCs and two of the five NWI-PES subscales: "nursing foundations for quality of care" ( $r = -0.21$ ,  $p < 0.001$ ) and "nurse manager ability, leadership, and support of nurses" ( $r = -0.16$ ,  $p = 0.006$ ).

### Predicting missed nursing care based on practice environment subscales

According to Table 3, linear regression analysis showed that only "nursing foundations for quality of care" ( $\beta = -0.22$ ,  $p = 0.036$ ) of the five NWI-PES subscales could predict MNC.

## Discussion

The main objective of this study was to determine the status of MNCs, the characteristics of PEs, and the relationships between these two variables among Iranian nurses working in two teaching hospitals. The findings showed that 41% of nurses reported frequently or always missing at least one aspect of nursing care. A systematic review also reported that 55–98% of nurses missed at least one course of nursing care [24]. However, the overall mean score of MNCs in our study was 32.3. A literature review revealed that our study's mean MNC score was lower than that reported in the United States, Turkey, and Australia, except for Iceland [25]. By comparing our study results with those from other countries [26], it can be concluded that low MNCs were reported in our study. Like in many previous studies, in this study, we used the self-reporting method. The reason for the lower mean score of MNCs in our study compared to

**Table 1** Description of participants general characteristics ( $n = 255$ )

Variables		n (%)
Gender n (%)	Female	215 (84.3)
	Male	40 (15.7)
Marital status n (%)	Single	79 (30.9)
	Married	174 (68.2)
	Divorced	2 (0.9)
Types of employment n (%)	Definitive official (permanent)	92 (36.1)
	Official trial	11 (4.3)
	Contract (5-year contract)	119 (46.7)
	Contractual (1-year contract)	29 (11.4)
Education n (%)	85-day contract	4 (1.5)
	Bachelor of science	244 (95.7)
Work place n (%)	Master of science	11 (4.3)
	Critical care units	93 (36.5)
Shift type n (%)	Emergency	45 (17.7)
	Medical	57 (22.3)
	Surgical	60 (23.5)
Position n (%)	Fixed	26 (10.2)
	Rotating	229 (89.8)
Age Mean $\pm$ SD	Head nurse	13 (5.1)
	Charge nurse	9 (3.5)
	Staff nurse	233 (91.4)
Work experience Mean $\pm$ SD		$33.94 \pm 7.40$
		$9.25 \pm 7.14$

Abbreviations: n: number of participants; SD: standard deviation

**Table 2** Description of missed nursing care status

Nursing care	Mean ± SD	Rarely missed n (%)	Occasion-ally missed n (%)	Frequently missed n (%)	Always missed n (%)
Ambulation 3 times per day or as ordered	1.33 ± 0.54	179 (70.2)	68 (26.7)	7 (2.7)	1 (0.4)
Turning patient every 2 h	1.40 ± 0.63	169 (66.3)	71 (27.8)	12 (4.7)	3 (1.2)
Feeding patient when the food is still warm	1.58 ± 0.78	143 (56.1)	82 (32.2)	21 (8.2)	9 (3.5)
Setting up meals for patient who feed themselves	1.56 ± 0.82	149 (58.4)	79 (31)	13 (5.1)	14 (5.5)
Medications administered within 30 min before or after scheduled time	1.27 ± 0.53	195 (76.5)	51 (20)	8 (3.1)	1 (0.4)
Vital signs assessed as ordered	1.12 ± 0.36	227 (89)	25 (9.8)	3 (1.2)	-
Monitoring intake/output	1.12 ± 0.36	225 (88.2)	27 (10.6)	3 (1.2)	-
Full documentation of all necessary data	1.14 ± 0.37	219 (85.9)	34 (13.3)	2 (0.8)	-
Patient teaching about procedures, tests, and other diagnostic studies	1.29 ± 0.49	183 (71.8)	68 (26.6)	4 (1.6)	-
Emotional support to patient and/or family	1.58 ± 0.70	135 (52.9)	92 (36.1)	26 (10.2)	2 (0.8)
Patient bathing/skin care	1.64 ± 0.74	127 (49.8)	98 (38.4)	24 (9.4)	6 (2.4)
Mouth care	1.58 ± 0.78	146 (57.3)	75 (29.4)	27 (10.6)	7 (2.7)
Hand washing	1.31 ± 0.55	185 (72.6)	60 (23.5)	9 (3.5)	1 (0.4)
Teach patient about plans for their care after discharge and when to call after discharge	1.26 ± 0.53	196 (76.8)	53 (20.8)	3 (1.2)	3 (1.2)
Bedside glucose monitoring as ordered	1.05 ± 0.25	244 (95.7)	9 (3.5)	2 (0.8)	-
Patient assessments performed each shift	1.14 ± 0.38	220 (86.3)	32 (12.5)	3 (1.2)	-
Focused reassessments according to patient condition	1.28 ± 0.50	188 (73.7)	61 (23.9)	6 (2.4)	-
IV/central line site care and assessments according to hospital policy	1.10 ± 0.31	230 (90.2)	24 (9.4)	1 (0.4)	-
Response to call light is initiated within 5 min	1.25 ± 0.55	199 (78)	49 (19.2)	3 (1.2)	4 (1.6)
PRN medication requests acted on within 15 min	1.14 ± 0.36	218 (85.9)	35 (13.7)	1 (0.4)	-
Assess effectiveness of medications	1.37 ± 0.58	173 (67.8)	68 (26.7)	14 (5.5)	-
Attend an Interdisciplinary Patient Care Conference	1.84 ± 0.87	107 (41.9)	93 (36.5)	42 (16.5)	13 (5.1)
Assist with toileting needs within 5 min of request	1.62 ± 0.83	144 (56.5)	71 (27.8)	28 (11)	10 (3.9)
skin wound care	1.23 ± 0.48	202 (79.2)	48 (18.8)	4 (1.6)	1 (0.4)
Total MNC <sup>†</sup> score Mean ± SD	32.34 ± 7.43				

Abbreviations: N: number of participants; MNCs: missed nursing care; SD: standard deviation

†Total MNC score ranges from 24 to 96

**Table 3** Results of linear regression test for the impact of practice environment subscales on missed nursing care

	B	SE	β	t	Sig.
Constant	39.08	2.38		16.37	0.000
Nurse participation in hospital affairs	0.74	1.39	0.057	0.53	0.596
Nursing foundations for quality of care	-3.24	1.53	-0.224	-2.11	0.036 <sup>†</sup>
Nurse manager ability, leadership, and support of nurses	-0.70	1.26	-0.061	-0.55	0.581
Staffing and resource adequacy	-0.29	1.05	-0.025	-0.28	0.778
Collegial nurse–physician relations	0.65	0.80	0.064	0.82	0.412

†p < 0.05 is considered statistically significant

Abbreviations: B: unstandardized beta coefficient; SE: standard error of B; β: standardized regression coefficient; t: student t test; Sig: statistical significance/p value

that in other studies might be due to two biases: “acquiescence response style” (tendency to respond positively) and “social desirability bias” (tendency to present oneself socially to be acceptable, but it does not fully reflect the reality of the individual). Due to the two biases mentioned earlier, the ‘truth-telling’ in our survey might have been compromised. This is because we used the self-reporting method to collect data, and the nature of MNCs is one of the essential aspects of ethics in nursing. The study findings indicated that patients who participated in interdisciplinary conferences had the highest

mean score. However, not attending training classes can decrease knowledge and make nursing care less updated, ultimately reducing the quality of care provided to patients [27]. This finding is consistent with that of another study conducted in Brazil [7]. Based on our field experiences and observations, several factors, including the following, seem to play a significant role in missing nursing care:

- (a) Time limitation due to a nursing shortage.



- (b) Inappropriate timing of training classes or conferences and conflicts in daily schedules.
- (c) There is a lack of support and encouragement from managers, especially hospital managers.
- (d) Inappropriate and nonequipped venues for classes.
- (e) Improper teaching methods and giving lectures instead of using new teaching methods.
- (f) There is a lack of proper alert reminders for nurses regarding the date, time, and place of meetings.

Our study revealed that the lowest scores for missed care were related to items such as ‘bedside glucose monitoring as ordered’, ‘peripheral IV/central line site care and assessments according to hospital policy’, and ‘vital signs assessments as ordered.’ The lower scores associated with this care could be attributed to the use of an accurate system for recording patients in patient files and additional unique records above patients’ beds in the current research environment, which helps staff remember and check this care more often. However, these care tasks are crucial parts of a patient’s vital nursing care and should be performed during each work shift to monitor the patient’s hemodynamic status. This information about each patient was provided to the assigned nurse during the shift handover. A lack of ‘blood sugar control’ was also indicated in the studies of Smith et al. [17] in the U.S.

Our study revealed a low PE score among the participating nurses. Given that nurses have greater responsibility for caring and have essential tasks such as performing technical procedures, making decisions, and leading patient care, such tasks are affected by poor practices. Consequently, patient and family satisfaction decreases, and adverse patient outcomes, such as mortality and infection, may increase. Azevedo Filho et al. also demonstrated a poor nursing practice environment in Brazil [13], consistent with our study results. In another study [17], the average PE score was significantly greater than that in our study and that of Azevedo Filho et al. [13]. The high score in the Smith et al. research population could be because the surveyed hospitals were magnet hospitals. In magnet hospitals, there is more focus on creating a healthier and more desirable work environment. Our study revealed a significant inverse correlation between PE characteristics and MNCs. In other words, missed nursing care increases significantly in patients with unfavorable PEs. However, this relationship was not strong. Several researchers have emphasized the importance of providing qualified nursing services and improving the nursing work environment [17].

Among the different dimensions of PE, “nursing foundations for quality of care” and “nurse manager ability, leadership, and support of nurses” had significant relationships with MNCs. These findings suggest that targeted interventions aimed at improving each dimension

of PE can help reduce the incidence of MNCs. Additionally, the ability of nursing managers and leaders should be accompanied by reduced missed care because nursing managers are responsible for managing the working conditions of nurses, determining their duties, coordinating existing resources, and developing basic nursing settings for the quality of patient care [28].

Our study on the relationship between nurses’ occupational and demographic variables and MNCs contradicts the findings of Blackman et al. [29], who indicated that men’s mean score for missed care is significantly greater than women’s. A study conducted in Iran also showed that female nurses’ quality of nursing care is greater than that of male nurses [30]. Women tend to care for patients more carefully, and less missed care is provided by women. Except for gender, the results of our study suggested no correlation between MNCs and other occupational and demographic variables of nurses.

### Limitations

The study offers insights into missed nursing care and its relationship with the practice environment. However, several limitations should be considered. The study’s cross-sectional design creates potential biases, which may limit our ability to establish causation. Additionally, the reliance on self-reports introduces the likelihood of response bias. Furthermore, the study focused on specific hospitals in Zanjan Province, which may restrict the generalizability of the findings to a broader context. Confounding factors, which are inherent to observational studies, might influence the observed relationships. Despite the abovementioned limitations, the study provides valuable contributions to comprehending the complex dynamics between the practice environment and missed nursing care.

### Conclusion

According to our study, nurses consistently neglect a significant portion of nursing care, with patient-related team meetings and training sessions being the most overlooked. This is a noteworthy finding. The findings highlight a possible lack of awareness or inadequacy in planning critical sessions, which demands increased attention. Notably, basic nursing care is the second most commonly overlooked aspect of care. The unfavorable practice environment identified in the hospitals under study highlights the urgent need for improvement by planners and senior managers. Notably, our findings demonstrated a significant statistical relationship between the practice environment and unattended nursing care. This indicates that improving the practice environment could help reduce the number of missed care cases. Notably, managerial competencies, particularly leadership, are vital in preventing overlooked nursing

care. These results provide essential insights for the field, highlighting the importance of targeted improvements in practice environments to improve patient care outcomes. Our research provides a foundation for future research and interventions to optimize nursing care delivery.

#### Abbreviations

ANOVA	Analysis of Variance
MNC	Missed Nursing Care
NQF	National Quality Forum
PE	Practice Environment
TOL	Tolerance
VIF	Variance Inflation Factor

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#### Author contributions

Study design: KA. Data collection: SB. Data analysis: KA, FR. Study supervision: KA. Manuscript writing: KA, SB, FR. Critical revisions for important intellectual content: KA, FR.

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#### Data availability

No datasets were generated or analysed during the current study.

#### Declarations

##### Ethics approval and consent to participate

The research proposal with the code IR.ZUMS.REC.1399.053 was approved by the Zanjan University of Medical Sciences' Biomedical Research Ethics Committee (ZUMS.REC). We obtained written informed consent from all participants and preserved the confidential identity of each participant throughout the study. Before using the two MISSCARE Survey and Practice Environment Scale questionnaires, permission was obtained from the developers of the participants (Professor Kalisch and Professor Lake, respectively) through email.

##### Consent for publication

Not applicable.

##### Competing interests

The authors declare no competing interests.

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