ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

INVESTIGATION OF THE RELATIONSHIP BETWEEN STRESS, WORKLOAD, MEDICAL ERROR TENDENCY AND PERCEIVED QUALITY OF CARE IN SURGICAL NURSES

Selda Mert[1], *Özlem Kersu**[2]

1. Faculty of Health Sciences, Department of Nursing, Kırşehir Ahi Evran University, Kırşehir, Türkiye
2. Faculty of Health Sciences, Department of Nursing, Eskişehir Osmangazi University, Eskişehir, Türkiye

Correspondence: ozlem_8420@hotmail.com

ABSTRACT

OBJECTIVE:

The study investigated the relationship between stress, workload, tendency to make medical errors, and perceptions of quality of care among surgical nurses.

METHODS:

The study has a cross-sectional, descriptive, and correlational design, involving a sample of 432 nurses working within surgical wards across two university hospitals in Türkiye. Data were collected from February 15, 2023, to December 31, 2023. The Nurse Stress Scale (NSS), the Workload Scale (WLS), the Tendency to Medical Error Scale (TMES), and the Caring Behaviors Inventory-24 (CBI-24) were used to collect data.

RESULTS:

It was determined that the frequency of stress and workload experienced by surgical nurses were moderate, their tendency for medical errors was low, and their perception of quality of care was high. A significant negative correlation was observed between the total score of TMES and the NSS total score (r= -0.084, p=0.048) and the WLS total score (r= -0.091, p=0.046). Additionally, a significant positive correlation was observed between the total score of TMES and the CBI-24 total score (r=0.116, p=0.015).

CONCLUSIONS:

It was determined that surgical nurses' stress levels, workload perceptions, medical error tendencies, and care quality perceptions were related to each other. Both individual and institutional arrangements to be made in line with these recommendations will make a significant contribution to increasing the quality of care, which is the key point of nursing practices, and to reducing the rates of tendency to medical errors, which is a quality indicator.

KEYWORDS

medical errors, surgical nurses, occupational stress, quality of care, workload, Türkiye

INTRODUCTION

It is known that nurses working in surgical clinics perceive stress in the workplace more intensely, which is considered a global threat [1,2,3]. This situation arises due to individual and organizational factors such as heavy workloads, staff shortages, and interpersonal conflicts, as well as the need for nurses working in surgical clinics to make quick and critical decisions and the fact that surgical clinics are high-risk work environments due to exposure to infections or hazardous materials [2, 4, 5, 6]. Studies on this topic emphasize that nearly half of nurses working in surgical clinics experience high levels of stress, and that excessive workload is particularly associated with perceived stress [3,7, 8].

It has been shown that excessive workload not only increases nurses' perception of stress, but also increases the likelihood of medical errors by causing physical fatigue or distraction [6,9]. Medical errors can lead to situations that threaten patient safety, ranging from minor issues to serious injuries and even death [10]. Examples of medical errors that can threaten patient safety include failure to verify patient identity, inappropriate medication administration, incorrect record keeping, patient falls, transfusion errors, and hospital infections [11]. Given the critical and rapid decision-making requirements in surgical clinics and the complexity of surgical patient care, the risk of encountering such medical errors can be high [12]. Nurses' high stress levels, excessive workload, and risk of medical errors negatively affect the quality of care, which is the most important outcome of the nursing profession [13,14]. A study found that the vast majority of surgical patients had a positive perception of nursing care and emphasized that adequate staffing levels were among the factors affecting the perception of care quality. This situation indicates that there is a relationship between surgical nurses' workload and their perception of care quality [15]. Another study noted that high workload perception not only increases the likelihood of medical errors but also negatively affects nurses' clinical decision-making processes, and therefore, interventions targeting such emotional and physical stressors should be planned [16].

Providing high-quality healthcare depends on ensuring both the quality and safety of patient care. Therefore, it is essential to address the competence of nursing staff, reduce workload and stress, and minimize medical errors in order to maintain quality and safe patient care. In particular, there are no comprehensive studies in the current literature examining the interrelationships between stress, workload, tendency toward medical errors, and perceptions of care quality among surgical nurses. Therefore, the aim of this study was to investigate the relationships of surgical nurses' stress, workload, medical error proneness, and perceptions of quality of care among nurses in surgical clinics.

This study investigated surgical nurses' stress levels, workload perception levels, medical error tendencies, factors contributing to medical errors, perceptions of care quality, and the relationship between stress levels, workload perception levels, medical error tendencies, and perceptions of care quality.

METHODS

STUDY DESIGN AND LOCATION

This study employed a cross-sectional and correlational design and was conducted in two university hospitals in in different geographical regions of Türkiye.

STUDY POPULATION AND SAMPLE

The population of this study consists of 600 surgical nurses working in two university hospitals. No sampling method was used, as the aim was to reach the entire population. The inclusion criteria for the study were working in surgical units and voluntarily participating in the study, while the exclusion criteria were being on leave or sick leave during the study period, and not voluntarily participating in the study. In this context, the study sample consisted of 432 surgical nurses who were available during the specified time period and met the inclusion criteria, representing a participation rate of 72%.

STUDY INSTRUMENTS

In this study "Descriptive Information Form for Nurses," the "Nursing Stress Scale," the "Workload Scale," the "Medical Error Tendency Scale," and the "Caring Behavior Inventory-24 (CBI-24)" were used as study instrument to collect data.

Nursing Stress Scale (NSS): The stress experienced by nurses in hospital settings was assessed using the scale designed by Gray-Toft and Anderson in 1981 [17], which was subsequently validated and proven reliable for Turkish use by Mert, Aydın-Sayılan, and Baydemir in 2020 [18]. The scale comprises 34 questions grouped into 7 factors. The total score on the scale assesses the overall frequency of stress experienced by a nurse and is computed by summing the responses to all items. Higher total score on the scale shows more frequent experiences of stress across various physical, psychological, and social stressors. The Cronbach alpha reliability coefficient for nurses was 0.93 in the original study [18] and 0.95 in this study.

The Workload Scale (WLS): Created by Duxbury and Higgins in 1994, the scale assesses the workload, incompatibility, and perceived lack of control in participants' work. Consisting of 11 items, the scale has factors such as time, knowledge, skills, and responsibilities required for the job, and work intensity and the individual's perception of workload. The scale ranges from a minimum score of 11 to a maximum of 55. Each item prompts individuals to indicate their level of agreement and perception of workload by selecting the most appropriate number. A higher score on the scale signifies a greater perceived workload and a reduced capacity to tolerate the job [19]. The Turkish validity and reliability of the scale were established by Aycan and Eskin in 2005. Cronbach's alpha reliability coefficient of the scale was 0.82 for the original scale [20] and 0.87 for this scale.

The Tendency to Medical Error Scale (TMES): The scale was devised by Özata and Altunkan in 2010 to assess nurses' tendency toward making medical errors. It comprises 49 items organized into five subdimensions, reflecting routine patient care activities. The overall Cronbach Alpha coefficient for the scale is 0.95, demonstrating high internal consistency [21]. In the current study, the Cronbach alpha reliability coefficient for the scale was 0.93.

The Caring Behaviors Inventory-24 (CBI-*24*): The CBI-24 is a short version of the "Caring Behaviors Scale" with 42 items, designed for mutual assessment by both patients and nurses, developed by Wu et al. in 2006 [22]. Its Turkish validity and reliability study was performed by Kurşun and Kanan in 2012. The total scale score is computed by summing the scores of all 24 items and dividing by 24. Higher total and subdimension scores indicate better perceived quality of care by either patients or nurses [23]. The Cronbach alpha reliability coefficient for nurses was 0.96 [23] in the original study and 0.92 in this study.

DATA COLLECTION

Data were collected from surgical nurses in the relevant hospitals between February 15, 2023, and December 31, 2023, using data collection forms by face to face and online methods.

In the first study location; study's purpose, methodology, and anticipated benefits were outlined in an Informed Voluntary Consent Form provided to participants, reported that filling the study instruments would be take approximately 10 minutes and study instruments these forms were distributed in sealed envelopes at the nurse desks in the surgical wards. Voluntary nurses completed Informed Voluntary Consent Form and all study instruments then placed it back in the envelope, and returned it to the nurse's desk.

In the other study location; face-to-face interactions were restricted due to COVID-19 safety measures, data collection forms were distributed to nurses using an online platform (Google docs form). Online forms were shared with participants via social networking platforms and messaging applications (Instagram, Facebook, and WhatsApp). The survey was structured in a way that participants could not move on to the next question without answering the current question.

In the study, face-to-face and online data collection methods were used, and various measures were taken to minimize the risk of bias in participant responses. First, participants were informed of the purpose of the study, that the data would be used solely for scientific purposes, and that their personal information would be kept strictly confidential. Valid and

reliable scales were used, and the questions in the information form created by the researcher were prepared in a neutral manner, avoiding leading statements; positive and negative statements were distributed in a balanced manner. The order of the questions and scales was randomized in the online form. In face-to-face applications, forms with the same content but different question and scale orders were used to ensure variability among participants. During the face-to-face data collection process, all administrators were given standard guidelines and approached participants with a neutral tone of voice and body language. In online surveys, attention control items (questions that would create inconsistencies) were added to confirm that participants read and answered the questions carefully. After data collection, inconsistent responses, forms completed in an excessively short time, and straight-lining (consistently identical responses) were identified and excluded from analysis. Additionally, systematic differences between face-to-face and online datasets were examined, and potential bias effects were evaluated.

ETHICAL CONSIDERATIONS

The study received ethical approval from the Kocaeli University Non-Interventional Clinical Research Ethics Committee under decision number KU GOKAEK-2023/03.22, dated 09.02.2023. Institutional permission was also obtained from both two hospitals. Written and verbal informed consent was received from the scale's developers and the nurses.

STATISTICAL ANALYSIS

The IBM SPSS 20.0 package program was used for statistical analysis (IBM Corp., Armonk, NY, USA). Normal distribution conformity was assessed using the Kolmogorov-Smirnov test. Numerical variables were presented as median (25th-75th percentile) and frequency (percentages). Cronbach's alpha coefficients were calculated to assess the internal consistency and reliability of the scales. For comparisons between variables not following a normal distribution, the Mann-Whitney U test and Kruskal-Wallis test were applied. The relationship between numerical variables was examined using Spearman correlation analysis. A significance level of $p<0.05$ was accepted as significant in two-way tests.

RESULTS

The demographic characteristics of surgical nurses revealed a median age of 31.0 years, a median length of service in the clinic of 2.0 years, and a median weekly working hours of 45.0. 88.7% were female, 65.7% were married, 58.3% held a bachelor's degree, 55.5% worked in surgical services, 87.5% expressed willingness to continue nursing, 88% were willing to remain in their current clinic, and 69% worked both day and night shifts (Table 1).

TABLE 1. DESCRIPTIVE CHARACTERISTICS OF NURSES (N=432) (MEDIAN (25.-75. PERCENTILE) / N (%))

Characteristics		Median (25. – 75. percentile)	
Age		31.00 (18.00-55.00)	
Work experience in the current clinic (year)		2.00 (1.00-5.00)	
Weekly working hours		45.00 (8.00-170.00)	
		n	**%**
Gender	Female	383	88.7
	Male	49	11.3
Marital status	Single	148	34.3
	Married	284	65.7
Education level	Health Vocational High School	94	21.8
	Associate degree	50	11.6
	Bachelor's degree	252	58.3
	Postgraduate	36	8.3

Current clinic	Operating room	54	12.5
	Surgical services	240	55.5
	Surgical intensive care units	111	25.7
	Emergency service	27	6.3
Practicing nursing willingly	Yes	378	87.5
	No	54	12.5
Working willingly in the current clinic	Yes	380	88.0
	No	52	12.0
Working pattern	Day shift	121	28.0
	Night shift	13	3.0
	Day and night shifts	298	69.0
Total		**432**	**100.0**

Surgical nurses' stress scores [76.00 (67.00-86.00)] were at an average level, their workload perception scores [36.00 (30.75-41.00)] were slightly above average, their tendency to medical errors was above average [241.00 (228.00-245.00)] and their care quality perception levels [5.25 (4.83-5.62)] were at an average level (Table 2).The study showed that surgical nurses' stress levels were average [76.00(67.00-86.00)], while their workload perception scores were slightly above average [36.00(30.75-41.00)]. Additionally, nurses' tendency toward medical errors was above average [241.00(228.00-245.00)], and their perception of quality of care was at an average level [5.25(4.83- 5.62)] (Table 2).

TABLE 2. MEDIAN SCORES OF THE NSS, THE WLS, TMES AND THE CBI-24 (N=432) (MEDIAN (25.-75. PERCENTILES) / N (%))

Scales	Scale Subdimensions	Median (25. – 75. percentiles)
NSS	Uncertainty Concerning Treatment	16.00 (16.00-20.00)
	Workload	15.00 (12.00-18.00)
	Death of the Patient	12.00 (10.00-15.00)
	Conflict with the Physician	10.00 (10.00-13.00)
	Conflict with Other Nurses	10.00 (10.00-12.00)
	Lack of Support	6.00 (5.00-7.00)
	Patient Suffering	5.00 (4.00-6.00)
	The Nursing Stress Scale Total Score	**76.00 (67.00-86.00)**
WLS Total Score		**36.00 (30.75-41.00)**
TMES	Medication and Transfusion Applications	90.00 (87.00-90.00)
	Prevention of Infections	60.00 (56.00-60.00)
	Patient-Follow-up and Material-Device Safety	45.00 (39.75-45.00)
	Prevention of Falls	25.00 (22.00-25.00)
	Communication	25.00 (24.00-25.00)
	The Tendency to Medical Error Scale Total Score	**241.00 (228.00-245.00)**
CBI-24	Assurance	1.75 (1.62-1.91)
	Knowledge-skill	1.16 (1.08-1.25)
	Respectfulness	1.29 (1.16-1.41)
	Connectedness	1.04 (0.91-1.16)
	The Caring Behaviors Inventory-24 Total Score	**5.25 (4.83- 5.62)**

CBI: The Caring Behaviors Inventory-24; NSS: The Nursing Stress Scale; WLS: The Workload Scale; TMES: The Tendency to Medical Error Scale

Regarding the relationship between certain characteristics of surgical nurses and their total scale scores, a significant negative correlation was observed between nurses' age and the median total score on the WLS (r= -0.142, p=0.003), a significant positive relationship was observed between weekly working hours and the WLS total score (r=0.163, p=0.001), a significant positive correlation between CBI-24 total scores and TMES scores (r= -0.116, p=0.015), along with a negative

weak correlation between TMES and NSS total scores (r= -0.084, p=0.048) and between TMES and WLS total scores (r= -0.091, p=0.046), (Table 3).

TABLE 3. THE RELATIONSHIP BETWEEN CERTAIN CHARACTERISTICS OF SURGICAL NURSES AND THE MEDIAN SCORES OF THE CBI-24, TMES, NSS, AND WLS (N=432)

r (p)*		Age	Work experience in the current clinic	Weekly working hours	CBI-24	TMES	NSS	WLS
Age	r	-	0.503	-,256	-0.018	-0.010	0.063	-0.142
	p		<0.001	<0.001	0.711	0.829	0.183	0.003
Work experience in the current clinic	r		-	-0.132	0.048	0.031	0.033	-0.044
	p			0.005	0.312	0.518	0.484	0.354
Weekly working hours	r			-	0.075	-0.079	-0.011	0.163
	p				0.113	0.096	0.817	0.001
CBI-24	r				-	0.116	-0.023	0.058
	p					0.015	0.633	0.224
TMES	r					-	-0.084	-0.091
	p						0.048	0.046
NSS	r						-	-0.009
	p							0.852
WLS	r							-
	p							

*: Spearman Correlation Analysis;

CBI: The Caring Behaviors Inventory-24; NSS: The Nursing Stress Scale; WLS: The Workload Scale; TMES: The Tendency to Medical Error Scale; *Bold faced values are shown as p< 0.05

In the study, a comparison of total scale scores based on specific characteristics of surgical nurses revealed several significant findings. The median WLS total score differed significantly depending on the clinic where the nurses worked (p<0.001). Nurses in surgical intensive care had significantly higher workload scores than those in the emergency department (p=0.015), operating theatre (p=0.002), and surgical ward (p=0.027). Nurses who practiced willingly showed significantly higher WLS scores (p=0.003), and those who engaged in nursing willingly had significantly lower WLS scores (p=0.001). Nurses working willingly in their current clinic had significantly higher TMES scores (p=0.047), and those working willingly in their current clinic had significantly lower WLS scores (p<0.001). Additionally, a significant difference in WLS scores was found based on the nurses' working style (p<0.001), (Table 4).

TABLE 4. COMPARISON OF MEDIAN SCORES OF SURGICAL NURSES ACCORDING TO SOME CHARACTERISTICS OF CBI-24, TMES, NSS, AND WLS (N=432) (MEDYAN (25.-75. PERSENTIL)

Characteristics		NSS	TMES	CBI-24	WLS
Gender	Female	77.00 (67.00-87.00)	242.00 (229.00-245.00)	126.00 (116.00-135.00)	35.00 (30.00-41.00)
	Male	75.00 (68.00-83.50)	238.00 (220.00-245.00)	126.00 (116.50-134.00)	37.00 (32.50-39.50)
	p[a]	0.373	0.167	0.830	0.657
Marital status	Single	75.00 (65.75-86.25)	242.50 (229.00-245.00)	125.00 (113.75-135.00)	36.50 (31.00-40.00)
	Married	76.00 (68.00-86.00)	240.00 (228.00-245.00)	126.00 (118.00-134.00)	35.00 (30.00-41.00)
	p[b]	0.105	0.600	0.229	0.072

	Health Vocational High School	75.00 (67.00-84.25)	243.00 (228.00-245.00)	125.00 (112.00-136.00)	35.50 (29.00-40.00)
Education level	Associate degree	74.00 (63.75-86.00)	243.50 (229.00-245.00)	127.50 (117.75-134.25)	34.00 (29.75-39.00)
	Bachelor's degree	77.00 (68.00-87.00)	240.00 (227.00-245.00)	125.00 (116.00-135.00)	36.00 (31.00-41.00)
	Postgraduate	75.00 (64.50-87.50)	240.50 (227.00-244.75)	126.50 (120.00-133.00)	35.00 (29.00-41.25)
	p[b]	0.580	0.251	0.869	0.147
Current clinic	Operating room	75.00 (66.50-83.00)	242.00 (234.50-245.00)	126.00 (117.00-137.00)	34.00 (26.50-39.00)
	Surgical services	76.00 (66.00-87.00)	241.00 (227.00-245.00)	126.00 (117.00-135.00)	35.00 (31.00-40.00)
	Surgical intensive care units	78.00 (68.00-88.00)	239.00 (228.00-245.00)	125.00 (114.00-134.00)	39.00 (32.00-44.00)
	Emergency service	76.00 (69.00-87.00)	244.00 (234.00-245.00)	126.00 (111.00-136.00)	35.00 (27.00-39.00)
	p[b] p[c]	0.402	0.363	0.903	**p<0.001 p=0.015* p=0.002** p=0.027*** **
Practicing nursing willingly	Yes	76.00 (67.00-86.00)	242.00 (229.00-245.00)	126.00 (117.00-135.00)	35.00 (30.00-40.00)
	No	78.00 (68.00-88.00)	235.00 (219.75-243.00)	123.00 (112.00-134.25)	39.00 (34.00-43.00)
	p[a]	0.457	**0.003**	0.235	**0.001**
Working willingly in the current clinic	Yes	76.00 (67.00-86.00)	242.00 (229.00-245.00)	126.00 (116.00-135.00)	35.00 (30.00-40.00)
	No	77.50 (67.25-88.00)	239.50 (215.75-245.00)	124.50 (112.25-136.50)	40.50 (34.25-43.75)
	p[a]	0.593	**0.047**	0.607	**p<0.001**
Working pattern	Day shift	76.00 (68.00-88.00)	242.00 (228.00-245.00)	127.00 (116.00-136.00)	33.00 (28.00-39.00)
	Night shift	80.00 (68.00-89.00)	243.00 (238.00-245.00)	123.00 (117.50-135.00)	32.00 (28.50-42.50)
	Day and night shifts	76.00 (67.00-85.00)	241.00 (228.00-245.00)	126.00 (116.00-134.00)	37.00 (32.00-41.75)
	p[b]	0.722	0.489	0.834	**p<0.001**

CBI: The Caring Behaviors Inventory-24; NSS: The Nursing Stress Scale; WLS: The Workload Scale; TMES: The Tendency to Medical Error Scale

[a]: Mann-Whitney U Test; [b]: Kruskal-Wallis Test

[c]: Multiple Comparison Test; *: Emergency service - Surgical intensive care units, **: Operating room - Surgical intensive care units, ***: Surgical services – Surgical intensive care units

*Bold faced values are shown as p< 0.05.

DISCUSSION

This study investigated the relationship between surgical nurses' stress levels, perceived workload, tendency to make medical errors, and perceived quality of care. The study findings revealed that surgical nurses' stress levels and perceived quality of care were moderate, while their perceived workload and tendency to make medical errors were above

average. Additionally, it was observed that an increase in surgical nurses' tendency to make medical errors reduced their perception of care quality and increased their workload and stress levels.

Surgical units are known for their complexity and high stress levels due to the high level of exposure to physical, biological, and psychological risks that require quick decision-making and the intensive care needs of patients. These factors contribute to a heavier workload compared to other units [24]. The literature frequently emphasizes that nurses' high workload levels increase and exacerbate the stress they experience at work [18,25]. Contrary to these findings, a study by Ozyer and colleagues (2020) examining the effects of workload perception and occupational stress on the attitudes of surgical clinic nurses found that neither work stress nor workload perception affected attitudes toward medical errors [26]. Similarly, our study also found that stress levels did not affect perceived workload. This finding is consistent with Ozyer et al.'s results [26] and may be attributed to the fact that the surgical nurses in our sample reported average stress levels and slightly above-average perceived workload. It is important to reduce or control the risks to which surgical nurses are exposed in order to minimize their stress levels and perceived workload.

Excessive workload is one of the main causes of high stress levels among nurses and is associated with more frequent medical errors [27]. Nurses' workload and medical errors in their work environment also affect the quality of care [28]. Previous studies have shown a significant relationship between nurses' perceptions of their individual workload and their tendency to make medical errors [27,29,30]. Sabzi et al. (2019) examined medication error rates and their relationship with the complexity of care in a pediatric hospital and found a relationship between medication calculation errors ($r = 0.22$, $p = 0.03$) and incorrect medication administration ($r = 0.31$, $p = 0.00$) and the complexity of nursing care [31]. Our study supports these findings [31, 32,33, 34] and shows that high perceived workload among surgical nurses is associated with an increased tendency toward medical errors, while low perceived care quality is associated with an increased frequency of medical errors. The slightly above-average perceived workload and medical error tendencies observed among surgical nurses may have influenced these results (Table 2). Additionally, factors such as age, weekly working hours (Table 3), type of clinic, desire to practice nursing, desire to work in the current clinic, and work style (Table 4) also contributed to these results. These results are important in highlighting the need to plan initiatives that will increase the motivation of surgical nurses in the workplace.

Job stress is a major contributor to physical and mental health issues among nurses and can negatively impact patient safety [35]. Studies have shown that stressed nurses are more likely to make errors [33, 34], with research indicating that the tendency for medical errors increases alongside rising stress levels [3, 35]. However, a contrasting study by Ozyer et al. (2020) found that neither workload perception nor work-related stress influenced the medical error attitudes of nurses working in surgical clinics [26]. Consistent with the findings of Cerit et al. (2022), our study observed that an increase in stress levels among surgical nurses was associated with a higher tendency for medical errors [3]. This may be linked to the above-average rate of medical error tendencies noted in our study (Table 2), as well as factors such as nurses not willingly practicing or working in their current clinic (Table 4). Given that excessive stress can trigger medical errors in nursing practice, it is recommended to implement institutional strategies aimed at maintaining stress at manageable levels, including boosting motivation through supportive programs, enhancing working conditions, developing guidance policies for decision-making, sustaining team dynamics, and providing robust guidance and counseling services to help nurses manage stress effectively.

The workload of nurses is a critical factor in ensuring patient safety and guaranteeing the quality of care [5,36]. Studies have shown a relationship between nurses' workload and the quality of nursing care. A high patient-to-nurse ratio is associated with adverse events and decreased patient satisfaction. Additionally, an imbalance between the number of hospital staff and nurses' workload can negatively affect service quality, and high workload often leads to a decline in care quality [14,37]. Numerous studies have confirmed that increased workload is associated with a decline in patient care quality [36]. However, Abd El-Hamid et al. (2019) noted that there was no significant relationship between nurses' workload and care quality [37]. The literature emphasizes the importance of acknowledging the critical role of nursing managers in identifying and continuously monitoring factors affecting nursing care quality, implementing effective strategies, and improving care standards [36]. In our study, consistent with the findings obtained by Abd El-Hamid et al.

(2019), no relationship was found between nurses' perceptions of workload and their perceptions of care quality. According to our findings, surgical nurses' workload perceptions were slightly above average, while their perceptions of care quality were at average levels (Table 2). In particular, nurses working in the NICU, those who did not voluntarily work in the current clinic, and those assigned to both night and day shifts had higher workload (Table 4). However, this increased workload did not appear to be sufficient to negatively affect perceptions of care quality. This situation indicates that surgical nurses strive to fulfill their professional nursing roles under all conditions and prioritize care practices, which are the most important outcome of nursing interventions. In this process, it is recommended that institutional and unit managers plan initiatives to encourage nurses, as this will be effective in improving patient outcomes and expectations.

Work stress can affect nurses' care due to increased activity, workload, and responsibilities [13,33,38]. Work stress can have both direct and indirect effects on the delivery of nursing care and patient outcomes [33]. However, Rizkianti et al. (2020) found no significant relationship between workload, work stress, and nursing care [39]. Our study supports this (Table 3), and the average stress levels reported by surgical nurses in our study can be explained by their perception of high care quality (Table 2). In conclusion, surgical nurses may experience job stress and varying levels of workload, but these factors do not appear to affect their perception of care quality. There are many factors that influence stress. The results of this study can be interpreted as indicating that surgical nurses are able to manage their stress well in the clinical setting and do not reflect stress onto their work. However, further studies are needed that examine the individual factors causing stress and their impact on nursing interventions.

CONCLUSION

In this study, it was concluded that an increase in the level of work stress and workload of surgical nurses increases the tendency to make medical errors, whereas an improvement in the perception of the quality of care decreases the likelihood of medical errors. Based on these findings, it is recommended that nurses' working conditions should be optimized, socioeconomically empowered and institutional and governmental policies should be developed to reduce workload and stress, and that they should be individually aware of stress management strategies and be able to apply these strategies. Both individual and institutional arrangements to be made in line with these recommendations will make a significant contribution to increasing the quality of care, which is the key point of nursing practices, and to reducing the rates of tendency to medical errors, which is a quality indicator. In addition to workload and work stress, more studies are needed to examine factors that may influence the perceived quality of care for surgical patients and reduce the tendency of surgical nurses to make medical errors.

ACKNOWLEDGMENTS

We would like to thank Dr. Canan BAYDEMİR for her contribution to the statistical analysis and all surgical nurses who participated in the study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

FUNDING

The authors declare that no funding was provided for this study.

References

1. Asimah Ackah V, Adzo Kwashie A. Exploring the sources of stress among operating theatre nurses in a Ghanaian teaching hospital. International Journal of Africa Nursing Sciences. 2023, 18, 100540. https://doi.org/10.1016/j.ijans.2023.100540
2. Ozkan S, Aktas-Unlu H. The Effect of Workload Caused by the Pandemic on Depression, Anxiety and Stress Levels in Surgical and Operating Room Nurses. J Basic Clin Health Sci 2021; 2: 134-143.

3. Bulbuloglu S, Kapikiran G, Saritas S. Perceived and sources of occupational stress in surgical intensive care nurses. Proceedings of Singapore Healthcare 2021; 30(3): 200–205. https://doi.org/10.1177/2010105820963293
4. Kannappan SR, & Veigas J. Perceived stress and resilience among nurses working in a selected hospital at Mangalore. Journal of Health and Allied Sciences NU. 2022;12(03):247-252. https://doi.org/10.1055/s-0041736455. ISSN 2582-4287.
5. Elsayad H, Shazly M, & Mahmoud S. Nurses perception toward nursing workloads and its effect on nurses errors at Benha University Hospital. Egyptian Journal of Health Care. 2017;8(1):53-64. https://doi.org/10.21608/ejhc.2017.9735
6. Faremi FA, Olatubi MI, Adeniyi KG, & Salau OR. Assessment of occupational related stress among nurses in two selected hospitals in a city southwestern Nigeria. International Journal of Africa Nursing Sciences. 2019;10:68–73. https://doi.org/10.1016/j.ijans.2019.01.008
7. Demir, B. Effect of Perceived Stress in Nurses Working in Surgical Units During the Coronavirus Outbreak on Covid 19 Anxiety and Sleep Quality. Gevher Nesıbe Journal Of Medıcal And Health Scıences. 2022; 7(16), 111–117. https://doi.org/10.46648/gnj.334
8. Adriani, Prasanti & Triana, Yunida & Prabandari, Rani. (2022). The effect of workload on work stress of nurses in hospital. JHeS (Journal of Health Studies). 6 (2): 50-59. http://doi.org//10.31101/jhes.2727
9. Qureshi SM, Purdy N, Mohani A, Neumann WP. Predicting the effect of nurse-patient ratio on nurse workload and care quality using discrete event simulation. J Nurs Manag. 2019;27(5):971-980.
10. Ugur E, Kara S, Yildirim S, Akbal E. Medical errors and patient safety in the operating room. J Pak Med Assoc. 2016;66(5):593-7
11. Kiymaz D, Koç Z. Identification of factors which affect the tendency towards and attitudes of emergency unit nurses to make medical errors. J Clin Nurs. 2018;27(5-6):1160-1169. https://doi.org/10.1111/jocn.14148
12. Münger N, Yılmaz E. The Effects of Professional Experience of Nurses Working at Surgical Clinics on Their Tendency to Make Malpractice: Manisa Sample. Journal Of Van Health Sciences. 2023; 16(2):136-146. https://doi.org/10.52976/vansaglik.1219895
13. Baye Y, Demeke T, Birhan N, Semahegn A, Birhanu S. Nurses' work-related stress and associated factors in governmental hospitals in Harar, Eastern Ethiopia: A cross-sectional study. PLoS One. 2020;15(8):e0236782. https://doi.org/10.1371/journal.pone.0236782
14. Adriani P, Triana NY, Prabandari R. The effect of workload on work stress of nurses in hospital. JHeS (Journal of Health Studies). 2022;6(2):50-59. https://doi.org/10.31101/jhes.2727
15. Ehwarieme TA, Abote M, Josiah U. Patient Perceptions and Satisfaction with Quality of Post-operative Nursing Care: Insights from Surgical Wards in a Tertiary Healthcare Institution, Benin City, Nigeria Jordan Journal of Nursing Research,2025; 4 (2): 134-148 https://doi.org/10.14525/JJNR.v4i2.04
16. Abdul Manaf, S., Japar, S., Abdul Halain, A., Mustafa, N. F. M., & Kunjukunju, A. Navigating The Impact Of Nurse Workload On Medication Errors: A Systematic Review. International Journal of Education, Psychology and Counseling. 2025; 10 (58), 87-110. https://doi.org/10.35631/IJEPC.1058007
17. Gray-Toft P, Anderson J-G. The Nursing Stress Scale: development of an instrument. J Behav Assess. 1981;3(1):11-23.
18. Mert S, Aydin Sayilan A, Baydemir C. Nurse Stress Scale (NSS): Reliability and validity of the Turkish version. Perspect Psychiatr Care. 2021;57(2):443-454. https://doi.org/10.1111/ppc.12606
19. Duxbury L, Higgins C, & Lee C. Work-family conflict: A comparison by gender, family type, and perceived control. Journal of Family Issues. 1994;15(3):449–466.
20. Aycan Z, Eskin M. Childcare, spousal, and organizational support in predicting work-family conflict for females and males in dual-earner families with preschool children. Sex Roles. 2005;53(7):453–71.
21. Özata, M. ve Altunkan, H. Development of medical error tendency scale in nursing, and analysis of its validity and reliability. H. Kırılmaz (Ed.). Proceedings of the 2nd International Congress on Performance and Quality in Health Care. 2010; pp.415, Antalya: Baydan Press
22. Wu Y, Larrabee JH, Putman HP. Caring Behaviors Inventory: a Reduction of the 42-Item Instrument. Nursing Research. 2006;55(1):18-25. https://doi.org/10.1097/00006199-200601000-00003
23. Kurşun Ş, Kanan N. Validity and Reliability Study of the Turkish Version of Caring Behaviors Inventory-24. Journal of Anatolia Nursing and Health Sciences. 2012;15(4):229-35.

24. Uğurlu Z, Karahan A, Ünlü H, et al. The Effects of workload and working conditions on operating room nurses and technicians. Workplace Health & Safety. 2015;63(9):399-407. https://doi.org/10.1177/2165079915592281
25. Kokoroko E, Sanda MA. Effect of workload on job stress of Ghanaian OPD nurses: The role of coworker support. Saf Health Work. 2019;10(3):341-346. https://doi.org/10.1016/j.shaw.2019.04.002
26. Bölükbaş N, Özyer Y, Çilingir D. The Effect of Workload Perception and Occupational Stress on Medical Error Attitudes of Nurses Working in Surgical Clinics. Mid Blac Sea J Health Sci. 2020;6(1):6-17. https://doi.org/10.19127/mbsjohs.624390
27. Ratanto , Hariyati R, Mediawati A, Eryando T. Workload as the most Important Influencing Factor of Medication Errors by Nurses . Open Nurs J, 2021; 15 (1): 204-410. http://dx.doi.org/10.2174/1874434602115010204
28. desouky F, Mostafa H, Hassan H. Challenges facing staff nurses to maintain patient safety. Egyptian Journal of Health Care. 2021;12(4):762-772. https://doi.org/10.21608/ejhc.2021.204425
29. Karacabay K, Savcı A, Çömez S& Çelik N. Determination of the relationship between workload perceptions and medical error tendencies of surgical nurses. Mersin University Journal of Health Sciences. 2020; 13(3): 404-417 https://doi.org/10.26559/mersinsbd.686481
30. Fathizadeh H, Mousavi SS, Gharibi Z, Rezaeipour H, Biojmajd AR. Prevalence of medication errors and its related factors in Iranian nurses: an updated systematic review and meta-analysis. BMC Nurs. 2024;23(1):175. https://doi.org/10.1186/s12912-024-01836-w
31. Sabzi Z, Mohammadi R, Talebi R, Roshandel GR. Medication errors and their relationship with care complexity and work dynamics. Open Access Maced J Med Sci. 2019;7(21):3579-3583. https://doi.org/10.3889/oamjms.2019.722
32. Aydın Sayılan A, Mert Boğa S. Determination of relationship between job stress, job demands, job control, social support level and tendency to make medical errors of Nurses. Journal of Research and Development in Nursing. 2018;20(1):11-22. https://doi.org/10.69487/hemarge.696142
33. Babapour AR, Gahassab-Mozaffari N, Fathnezhad-Kazemi A. Nurses' job stress and its impact on quality of life and caring behaviors: a cross-sectional study. BMC Nurs. 2022;21(1):75. https://doi.org/10.1186/s12912-022-00852-y
34. Carlesi KC, Padilha KG, Toffoletto MC, Henriquez-Roldán C, Juan MA. Patient safety ıncidents and nursing workload. Rev Lat Am Enfermagem. 2017;25:e2841. https://doi.org/10.1590/1518-8345.1280.2841
35. Zabin LM, Zaitoun RSA, Sweity EM, de Tantillo L. The relationship between job stress and patient safety culture among nurses: a systematic review. BMC Nurs. 2023;22(1):39. https://doi.org/10.1186/s12912-023-01198-9
36. Maghsoud F, Rezaei M, Asgarian FS, Rassouli M. Workload and quality of nursing care: the mediating role of implicit rationing of nursing care, job satisfaction and emotional exhaustion by using structural equations modeling approach. BMC Nurs. 2022;21(1):273. https://doi.org/10.1186/s12912-022-01055-1
37. Abd El-Hamid A, Abd El-Wahab E, & Aly S. The relationship between the nursing work load and thequality of nursing care at a selected hospital in Menofya Governorate. The Medical Journal of Cairo University. 2019;87:4397-4403. https://doi.org/10.21608/mjcu.2019.78257
38. Yosef B, Woldegerima Berhe Y, Yilkal Fentie D, Belete Getahun A. Occupational stress among operation room clinicians at Ethiopian University Hospitals. J Environ Public Health. 2022;2022:2077317. https://doi.org/10.1155/2022/2077317
39. Rizkianti I, & Haryani A. The Relationship between workload and work stress with caring behavior of nurses in inpatient rooms. Jurnal Aisyah: Jurnal Ilmu Kesehatan. 2020;5(2):159-166. https://doi.org/10.30604/jika.v5i2.338