



Araştırma

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AN EVALUATION ON THE FACTORS AFFECTING THE LEVEL OF FATIGUE AND HANDOVER EFFECTIVENESS
OF EMERGENCY DEPARTMENT NURSES
ACİL SERVİS HEMŞİRELERİNİN YORGUNLUK DÜZEYİNİ VE DEVİR TESLİM ETKİNLİĞİNİ ETKİLEYEN
FAKTÖRLER ÜZERİNE BİR DEĞERLENDİRME

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ABSTRACT

It is predicted that due to the increasing work load of nurses, fatigue levels and knowledge transfer will be adversely affected. The present study aimed to determine the Fatigue Level, Handover Effectiveness, and Related Factors in Emergency Nurses. The study is a descriptive cross-sectional study. Research data were collected from nurses working in the emergency departments of 8 hospitals in a city in Türkiye. The data were collected through Google Form using the Personal Information Form, the Handover Evaluation Scale, and the Fatigue Scale. There is a negative and significant relationship between the nurses' fatigue levels and the handover effectiveness ($r=-0.476$ $p<0.001$). It was determined that there was a positive and meaningful relationship between the handover effectiveness and the handover duration and preparation time for the handover (in orderr= 0.573 $p<0.001$, $r=0.497$ $p<0.001$). In addition, the nurses who were elderly, dissatisfied with working in the emergency department, only working during the day, caring for more patients, and having a longer total working time and weekly average working time in the emergency department were more tired and had lower handover effectiveness quality ($p<0.05$). It is possible to develop strategies to reduce fatigue levels and increase the quality of handover effectiveness by determining the fatigue of emergency nurses and these factors affecting the quality of handover effectiveness.

ÖZ

Hemşirelerin artan iş yükü nedeniyle yorgunluk düzeylerinin ve bilgi aktarımının olumsuz etkileneceği öngörülmektedir. Bu çalışmada acil hemşirelerinde yorgunluk düzeyi, devir teslim etkinliği ve ilişkili faktörlerin belirlenmesi amaçlanmıştır. Çalışma tanımlayıcı türde kesitsel bir çalışmadır. Araştırma verileri Türkiye'de bir ilde bulunan 8 hastanenin acil servislerinde çalışan hemşirelerden toplanmıştır. Veriler Kişisel Bilgi Formu, Devir Teslim Değerlendirme Ölçeği ve Yorgunluk Ölçeği kullanılarak Google Form aracılığıyla toplanmıştır. Hemşirelerinin yorgunluk seviyeleri ile nöbet devir teslim etkinliği arasında negatif yönlü anlamlı bir ilişki vardır ($r=-0.476$ $p<0.001$). Nöbet devir teslimine hazırlık süresi ve nöbet devir teslim süresi ile nöbet devir teslim etkinliği arasında ise pozitif yönlü anlamlı bir ilişki olduğu belirlenmiştir (sırasıyla $r=0.573$ $p<0.001$, $r=0.497$ $p<0.001$). Ayrıca ileri yaşta olan, acil serviste çalışmaktan memnun olmayan, sürekli gündüz çalışan, daha fazla hastaya bakım veren, acil serviste toplam çalışma süresi ve haftalık ortalama çalışma süresi fazla olan hemşirelerin daha yorgun olduğu ve nöbet devir teslim kalitesinin daha düşük olduğu saptanmıştır ($p<0.05$). Acil servis hemşirelerinin yorgunluğunu ve nöbet devir teslim etkinlik kalitesini etkileyen bu faktörleri saptayarak, yorgunluk seviyelerini azaltmayı ve nöbet devir teslim etkinliği kalitesini artırmayı amaçlayan stratejiler geliştirmek mümkündür.

Keywords: Emergency nursing, nursing, fatigue, handover effectiveness, patient safety,

Anahtar kelimeler: Acil hemşireliği, hemşirelik, yorgunluk, nöbet devir teslim, hasta güvenliği,

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INTRODUCTION

Emergency services are a leading hospital service unit where patients with vital risks are given first service, frequent patient changes, priorities are constantly changing, and there is a high level of uncertainty.¹ The number of patients who apply to the emergency service due to population growth and epidemic diseases is increasing daily, creating a significant workload for nurses.² The inadequacy of the emergency nurse staff, which has been consistently reported over the years, and the resulting increased workload increase the fatigue levels of nurses.³ Fatigue is a feeling of sleepiness or lack of energy that can result in burnout. Among the most acute effects of fatigue are decreased motivation, impaired concentration, problems with recording processing, and inability to transfer information.⁴

One of the most intense moments of information transfer in the nursing profession is handover effectiveness.⁵ Handover effectiveness is two-way communication that transfers information and responsibility to one or more patients.⁶ During the handover, nurses convey their information to their colleagues verbally and in writing.⁵ This communication creates continuity among nurses and makes it easier for nurses to set priorities, plan patient care, and ensure continuity in care.⁷ However, the handover process is not just about patient information. It also includes identifying current problems, sharing knowledge, and providing emotional support to patients and their relatives.⁸ It is known that factors such as phone calls, noisy environment, unnecessary conversations, time pressure, distrust of other team members, and the fatigue levels of nurses are among the factors that reduce handover effectiveness.⁹ It is predicted that the fatigue levels of nurses may harm the quality of the handover effectiveness.^{10,11} Increasing fatigue levels threaten nurses' safety and patient care, negatively affecting nurses' neurocognitive functioning and hindering work performance.¹²

It is stated that the handover effectiveness at shift change is a sensitive activity for patient safety.¹³ Safe and effective patient care depends on the continuity and perfection of communication between healthcare professionals, especially nurses. In this respect, it cannot be ignored that effective communication is ensured in the handover of duty. However, studies suggest that the efficacy of handover is often incomplete and/or incorrect.^{10,14} Poor quality seizure handover effectiveness can negatively affect patients, staff, and healthcare institutions. Studies determined that poor quality seizure handover effectiveness caused a delay in diagnosis and treatment, inappropriate treatment, prolonged hospital stay, medication errors, and patient and nurse dissatisfaction.^{13,15} There are also studies stating that there is insufficient evidence about the effectiveness and outputs of the handover process.^{10,16}

The number of patients admitted for care in emergency departments has increased due to the corona virus pandemic.¹⁷ With the increase in the number of patients cared for, there has been a significant increase in the responsibilities and workload of nurses.² It is thought that this situation may cause both physical and mental fatigue in nurses and negatively affect the transfer of information. Therefore, this study aimed to determine fatigue level, handover effectiveness, and related factors

in emergency nurses.

MATERIALS AND METHODS

Study Design

This research was conducted in descriptive and cross-sectional types.

Participants

The research population consisted of 324 emergency nurses working in the emergency departments of a city hospital, a state hospital, a university hospital, and 5 private hospitals in a city in Türkiye. Data were collected between January and April 2022. The selection of the sample aimed at reaching the entire workforce. Nurses who directly participated in patient care in the emergency department, worked in the emergency department for at least six months, could speak and understand Turkish, and agreed to participate in the study were included in the study. Nurses who filled in the data collection form incompletely were not included in the study. The study's data collection process was completed with a total of 177 nurses (54.62% of the population). The flow chart of the research is given in Figure 1.

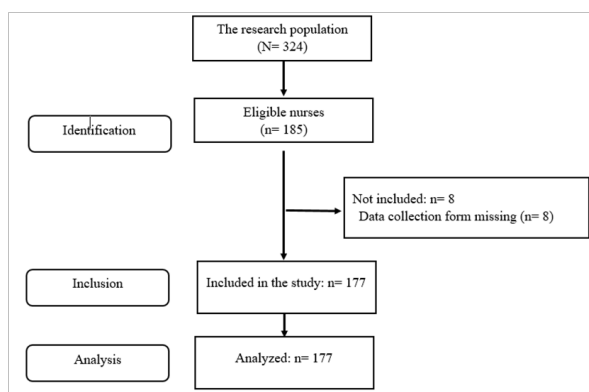


Figure 1: Flowchart of the Research

In order to calculate the power of the research, the mean score of the Handover Evaluation Scale (HES) was used in the G*Power program. Test family: t tests, Statistical test: Difference from constant (one sample case), Type of power analysis: Post hoc options were used.¹⁸ The nurses' HES score average (\bar{X} = 46.91) was entered in Mean H_1 , the nurses' HES standard deviation (SD= 15.11) was entered in the standard deviation, and the average score (40) according to the minimum and maximum scores that could be obtained in the Handover Evaluation Scale was entered in Mean H_0 . As a result of this calculation, the effect size was 0.40. In this direction, the working power was determined as 99% due to the post-power analysis that took effect size: 0.40, $n=177$, and $\alpha=0.05$.

Data Collection

Before starting data collection, the number of nurses working in the emergency departments of 1 City Hospital, 1 State Hospital, 1 University Hospital and 5 private hospitals in the province was determined. The nurses were reached through the nurses in charge of the emergency department. Responsible nurses were asked to transmit the data collection form created on Google Form to all nurses who met the inclusion criteria of the

study via WhatsApp. In order to maximize the response rate, emergency departments were revisited two weeks after the start of data collection and reminders about the study were given. The "Informed Consent Form" checkbox is mandatory in Google Form. While creating the form, standardization was ensured by limiting one response per IP address so that nurses could respond only once. The researcher's contact information was written on the informed consent forms, and the questions of the nurses who wanted to participate in the study were answered via telephone or e-mail.

Data Collection Tools

Research data were collected using the Personal Information Form, the Handover Evaluation Scale and the Fatigue Scale.

Personal Information Form

The form created by the researcher by examining the literature consists of 13 questions containing nurses' demographic and professional characteristics.^{16,19}

Handover Evaluation Scale

The scale was developed by O'Connell et al. in 2014. Tuna and Dalli performed Turkish validity and reliability in 2019.¹⁶ The scale consists of 10 items and two sub-dimensions. This scale uses a 7-point Likert-type rating, and each item is scored between 1 and 7. The efficiency of nurses' handover is evaluated with the total scale score. The highest 70 and the lowest 10 points can be obtained from the scale. As the total score obtained from the scale increases, the nurses' handover evaluation quality increases. In the scale's Turkish validity and reliability study, the Cronbach alpha value, the internal consistency coefficient, was found to be 0.92. In the study, the Cronbach alpha value of the scale was determined as 0.95.

Fatigue Scale

To assess chronic fatigue, the "Checklist Individual Strength" fatigue questionnaire developed by the Vecoulen et al. was used. The Turkish validity and reliability of the scale were done by Ergin and Yildirim.²⁰ The scale consists of 20 statements and four sub-dimensions measuring fatigue in the last two weeks. The highest score that can be obtained from the scale is 140, and the lowest score is 20. The scale is a Likert-type measurement tool consisting of degrees between 1 and 7. As the total score obtained from the scale increases, the severity and impact of fatigue also increase. In the validity and reliability study of the scale, the Cronbach alpha value, which is the internal consistency coefficient, was found to be 0.87. In the study, the Cronbach alpha value of the scale was determined as 0.89.

Ethical

Institutional permissions were obtained from the local university ethics committee (2021/60) and from the hospitals where the study was conducted in order to conduct the study. Permission was obtained from the scale developers via e-mail for the use of the scales used in the research. It was also stated that the data obtained from the research would be kept confidential and used only for scientific purposes. Informed consent was obtained from all nurses participating in the study. The principles of the Declaration of Helsinki were complied with at all stages of the study.

Evaluation of Data

The obtained data were evaluated in the computer envi-

ronment's software program of IBM SPSS Statistics 23.0 (IBM Corp., Armonk, New York, USA). The normal distribution of numerical data was examined with the Shapiro-Wilk test of normality. Descriptive statistics are given as numbers, percentages, mean, standard deviation, median and interquartile range. During the comparison of two independent groups, the data showing normal distribution were analyzed with the Independent Sample t-test. The data not normally distributed were analyzed with the Mann-Whitney U test. The One-Way Analysis of Variance was used for normally distributed data in comparing three or more independent groups. The Kruskal Wallis Test was used for data that did not show normal distribution. A post-hoc or Dunn's test was applied to the statistically significant data as a multiple comparison test. Pearson Correlation analysis was performed to statistically evaluate the relationship between scale scores and the relationship's direction and severity. A $p < 0.05$ value was considered statistically significant in all comparisons.

RESULTS

The distribution of demographic and professional characteristics of the nurses included in the study is given in Table 1, where it is shown that 45.2% were between the ages of 26-35, 67.2% were female, 58.2% were married, 49.2% had no children, and 74.6% had a bachelor's degree. Sixty-one per cent of the nurses stated that chose the emergency service willingly, 85.3% worked in shifts change, 59.3% were satisfied with working in the emergency department, 42.4% cared for an average of 6-10 patients per nurse, and 59.9% worked four years and less time in the emergency department, and 65.0% of them work 40-55 hours per week on average. In addition, it was determined that the preparation time of the nurses for the handover effectiveness of duty was 28.16 ± 18.10 minutes, and the handover effectiveness time of the nurses was 21.75 ± 12.77 minutes.

The mean scores and Cronbach Alpha values of the Nurses on the Handover Effectiveness Scale and the Fatigue Scale are given in Table 2. The mean score of the Handover Effectiveness Scale was 46.91 ± 15.11 , and the mean score of the Fatigue Scale was 82.79 ± 27.16 .

When the demographic and professional characteristics of the nurses were compared with the fatigue scale, it was determined that the age, number of children, willingness to choose the emergency service, working shift, number of patients per nurse, total working time in the emergency department and average weekly working time were statistically significant ($p < 0.05$). When the demographic and professional characteristics of the nurses were compared with the HES, it was determined that the age, willingness to choose emergency service, working shift, being satisfied to work in the emergency department, number of patients per nurse, total working time in the emergency department and average weekly working time were statistically significant ($p < 0.05$), (Table 3).

Table 4 shows the correlation analysis between the nurses' characteristics regarding handover times, the mean scores of the Handover Effectiveness Scale, and the Fatigue Scale. It has been determined that there is a positive and moderate significant relationship between nurses' HES and the preparation time for the handover

Table 1. Distribution of nurses' demographic and professional characteristics (n=177).

Characteristics	n(%)	Characteristics	n(%)
Age		Shifts	
≤25	48(27.1)	Daytime only	10(5.6)
26-35	80(45.2)	Only night	16(9.0)
36-45	34(19.2)	Shift change	151(85.3)
≥46	15(8.5)	Working in the Emergency Department	
Gender		Satisfied	105(59.3)
Female	119(67.2)	No satisfied	72(40.7)
Male	58(32.8)	Number of Patients Per Nurse	
Marital Status		≤5	28(15.8)
Married	103(58.2)	6-10	75(42.4)
Single	74(41.8)	11-15	49(27.7)
Number of Children		≥16	25(14.1)
No	87(49.2)	Total Working Time in the Emergency Department (Years)	
1	38(21.5)	≤4	106(59.9)
2	43(24.3)	5-9	33(18.6)
≥3	9(5.1)	≥10	38(21.5)
Educational Level		Average Working Time Per Week (Hours)	
Health vocational high School Associate degree	19(10.7)	40-55	115(65.0)
Licence	17(9.6)	56-71	46(26.0)
Graduate	132(74.6)	≥72	16(9.0)
The Situation of Willingly Choosing the Emergency Service		Handover Preparation Time (Mean ± SD) (minute)	28.16±18.10
Yes	108(61.0)	Handover Time (Mean ± SD) (minute)	21.75 ± 12.77
No	69(39.0)		

Table 2. The mean scores and alpha values of the Handover Effectiveness Scale and the Fatigue Scale (n=177).

Scales	Number of Items	\bar{X}	SD	Cronbach Alpha
Handover Effectiveness Scale	10	46.91	15.11	0.95
Fatigue Scale	20	82.79	27.16	0.89

of the shift and the time of the handover of the shift ($p < 0.001$). In addition, it has been determined that there is a negative and moderate significant relationship between the fatigue levels of the nurses and the quality of the handover effectiveness ($p < 0.001$).

DISCUSSION

Increased nurse fatigue can negatively affect work performance, harming patient safety. In addition, the quality of the handover effectiveness of nurses in shift changes is vital for patient safety.¹³ Poor quality seizure handover effectiveness can negatively affect patients, staff, and healthcare organizations. It is predicted that there is a relationship between the fatigue levels of nurses and the efficiency of shift handover.¹⁰ Therefore, this study investigated fatigue level, handover effectiveness, and related factors in emergency nurses.

The study determined that the fatigue levels of older nurses who have children, work unintentionally in the emergency department and only work during the day were statistically significantly higher. Similarly, studies have proven that nurses who have children and who are older have higher fatigue levels.^{21,22} Unlike the literature, our study findings determined that the fatigue levels of nurses who only work during the day are higher.^{19,23} A study determined that nurses with children experience intra-familial conflict and have high fatigue levels at work.²⁴ Most nurses who work only during the day must work six or seven days a week be-

cause they work overtime. Therefore, it was thought that the fatigue levels of nurses working during the day were higher due to their almost uninterrupted work. It is thought that these demographic factors related to nurse fatigue will provide evidence to institutions to develop strategies to reduce the fatigue levels of emergency nurses.

Many factors, such as staff shortage, unsystematic shifts, and overtime, can cause nurses to experience a heavy workload.²⁵ The workload can cause work fatigue in nurses and poses a significant risk for patient-nurse safety.²⁶ In this study, it has been proven that as the number of patients per nurse, the total working time in the emergency department, and the average weekly working time increase, the fatigue levels of the nurses increase. These findings are like the literature.^{21,27,28} However, a study in the literature also proves that experienced nurses tolerate acute fatigue better due to their productive work performance.²⁹ It has been determined that there is a significant relationship between workload and fatigue, which affects work motivation, physical fatigue, and activity.³⁰ Longer working hours may cause workers to be exposed to occupational diseases and reduce work motivation because employees do the same job for a long time.³¹ It can be said that good planning of working hours and workload in units with a heavy workload and requiring serious work performance, such as the emergency service, will effectively reduce the fatigue levels of nurses and will positively

Table 3. Comparison of the nurses' demographic and professional characteristics and the mean scores of the Handover Effectiveness Scale and the Fatigue Scale (n=177).

Characteristics	Fatigue Scale		HES	
	Mean±SD	p	Mean±SD	p
Age				
≤25	83.62 ± 27.73 ^{ab}	0.002	48.43 ± 13.68 ^{ab}	0.017
26-35	75.68 ± 25.47 ^a		49.46 ± 13.10 ^a	
36-45	90.67 ± 27.61 ^b		42.14 ± 17.71 ^b	
≥46	100.20 ± 21.59 ^b		39.26 ± 19.25 ^b	
Gender				
Female	81.97 ± 27.86	0.566	47.05 ± 14.89	0.857
Male	84.48 ± 25.81		46.62 ± 15.68	
Marital Status				
Married	82.74 ± 27.19	0.977	46.51 ± 15.50	0.679
Single	82.86 ± 27.29		47.47 ± 14.63	
The Situation of Willingly Choosing the Emergency Service				
Yes	78.58 ± 26.97	0.009	51.00 ± 13.71	<0.001
No	89.39 ± 26.30		40.50 ± 15.05	
	M (IQR)	p	M (IQR)	p
Number of Children				
No	88.00 (29.00) ^{ab}	0.040	52.00 (18.00)	0.430
1	75.00 (40.75) ^a		48.50 (22.00)	
2	84.00 (40.00) ^b		48.00 (34.00)	
≥3	90.00 (28.50) ^{ab}		42.00 (18.50)	
Educational Level				
Health vocational high School	79.00 (41.00)	0.285	53.00 (14.00)	0.306
Associate degree	85.00 (55.00)		60.00 (18.50)	
Licence	86.50 (33.50)		50.00 (20.25)	
Graduate	44.00 (50.00)		48.00 (34.00)	
Shifts				
Daytime only	111.50 (41.25) ^a	0.013	25.00 (45.50) ^a	0.023
Only night	82.50 (52.25) ^b		47.00 (31.00) ^{ab}	
Shift change	82.00 (28.00) ^b		51.00 (18.00) ^b	
Working in the Emergency Department				
Satisfied	80.00 (24.50)	0.191	54.00 (15.00)	<0.001
No satisfied	89.00 (64.00)		40.00 (25.00)	
Number of Patients Per Nurse				
≤5	78.00 (44.75) ^a	<0.001	53.00 (19.75) ^a	0.009
6-10	78.00 (51.00) ^a		52.00 (16.00) ^a	
11-15	90.00 (32.00) ^b		40.00 (31.00) ^b	
≥16	90.00 (42.50) ^b		45.00 (19.50) ^{ab}	
Total Working Time in the Emergency Department (Years)				
≤4	80.00 (50.00) ^a	<0.001	51.00 (20.25) ^a	<0.001
5-9	76.00 (16.00) ^a		55.00 (15.50) ^a	
≥10	111.00 (33.25) ^b		37.50 (32.00) ^b	
Average Working Time Per Week (Hours)				
40-55	76.00 (43.00) ^a	<0.001	53.00 (20.00) ^a	0.018
56-71	90.50 (33.50) ^b		48.00 (25.00) ^b	
≥72	105.00 (48.25) ^b		47.00 (32.75) ^b	

HES: Handover Effectiveness Scale, M: Median, IQR: Interquartile Range

The superscripts a, b indicate a difference within a group, and the same letters indicate that there is not an in-group difference, and different letters indicate an in-group difference.

Table 4. The relationship between nurses' characteristics regarding handover times, the mean scores of the Handover Effectiveness Scale, and the Fatigue Scale (n=177).

	Handover Preparation Time (minute)	Handover Time (minute)	Fatigue Scale	HES
Handover Preparation Time (minute)	1			
Handover Time (minute)	r=0.649 p<0.001	1		
Fatigue Scale	r=-0.247 p<0.001	r=-0.221 p<0.001	1	
HES	r=0.573 p<0.001	r=0.497 p<0.001	r=-0.476 p<0.001	1

HES: Handover Effectiveness Scale, r: Pearson correlation analysis

affect patient care.

The quality of the handover effectiveness in shift changes in emergency services is vital in ensuring and maintaining patient safety.³² In this study, in which the risk factors that may affect the efficiency of seizure handover in the emergency department were investigated; It has been determined that the quality of shift handover efficiency of nurses who are older, who constantly work during the day, and who are not satisfied with working in the emergency department, is lower. A study proved that the physical activity rate of nurses working the day shift was 89.3%, and the activity rate of nurses working night shifts was 65.8%.³³ Therefore, it was thought that daytime nurses had lower shift-handover effectiveness. As age progresses, nurses' level of work motivation and performance decreases.³⁴ Employee motivation determines productivity and work-related performance.³⁵ Therefore, it is thought that the job motivation level of the elderly nurses who are not satisfied with working in the emergency department effectively decreases the handover activity's performance. To prevent this situation, rotation among the nurses may be recommended after working in the emergency department for a certain period.

Due to the high number of patients and overtime, the workload increases, which may negatively affect the nurses' shift-handover effectiveness.³⁶ The study determined that nurses with high number of patients per nurse, total working time in the emergency department, and average weekly working time have a lower quality of handover effectiveness. A study proved that the high number of patients cared for harmed the efficiency of nurses' shift handover.³⁷ In emergency departments and complex and dynamic health care environments, nurses' work lists are often characterized by overtime and irregular shifts.³ Therefore, improvements that can be made regarding the number of nurses and working hours in emergency services can increase the quality of handover effectiveness and patient safety.

In the literature, it is suggested that the seizure handover time should be between 15-45 minutes, depending on the general condition of the patient and the number of patients in the clinic.¹⁶ In the study, similar to the literature, the handover time of emergency nurses was found to be 21.75 ± 12.77 . Having sufficient written and verbal information is essential for an effective handover.³⁷ Therefore, nurses must complete the necessary preparations before handover. The study determined a positive and significant relationship between the preparation for the handover, the time of handover, and the hand over's effectiveness. In other words, it has been concluded that the more time the nurses allocate for preparation and handover effectiveness, the more effective handover is. The effective use of communication and the complete transfer of information in the transfer of patient information is of great importance in ensuring patient safety.³⁸ For this reason, it may be recommended to plan for the handover process in health institutions, especially in emergency services, by the managers of the institutions.

Staff fatigue factor significantly affects communication.³⁹ Transfer of patient information accurately, clearly and systematically during the handover process is possible with communication between health profes-

sionals.⁶ Recently, there has been an enormous increase in patients due to the corona virus pandemic. This situation caused a rise in nurses' workload.¹⁷ In the literature, it has been proven that the fatigue levels of emergency nurses increase due to the increased workload.³ The study determined a statistically negative and significant relationship between the fatigue levels and the efficiency of hand over of emergency department nurses. In other words, as the fatigue levels of the nurse's increase, the quality of the handover effectiveness decreases.

It has been reported that most adverse events and nearly all errors are due to ineffective patient delivery.^{13,15} Similarly, there are studies in the literature that predict that nurses' fatigue levels negatively affect the quality of handover effectiveness.^{10,11} Therefore, it is thought that it is necessary to take measures at both individual and institutional levels to reduce the fatigue levels of emergency nurses for patient and employee safety.

There are several known limitations to this cross-sectional study. It is impossible to generalize the results because the research was carried out in a single province. Nurses' fatigue levels and quality of handover effectiveness are dynamic, and the cross-sectional survey results may only reflect information over a specific period. The limitations of the study are that the number of nurses constituting the population of the study is limited and that approximately half of the population can be reached in the sample. In addition, other variables may not be included in this study that could potentially affect nurses' fatigue levels and quality of shift handover. There are limited quantitative studies to determine the fatigue levels of emergency nurses and the factors affecting the quality of shift handover. Despite the limitations, it is thought that the findings of this study will contribute to the literature.

CONCLUSION

The increased fatigue levels of emergency nurses negatively affect the efficiency of shift handover, which is vital for ensuring and maintaining patient safety. It has been determined that there is a positive and moderate significant relationship between nurses' HES and the preparation time for the handover of the shift and the time of the handover. It was determined that the older nurses were not satisfied with working in the emergency department, working continuously during the day, caring for more patients, having a longer total working time in the emergency department, and a longer average weekly working time were more tired and had a lower quality of duty handover activity. The findings from this study contribute to determining the factors affecting the fatigue of emergency nurses and the quality of handover effectiveness. Therefore, it is recommended to develop strategies to reduce fatigue levels and improve the quality of handover effectiveness. Nurse leaders and researchers should be aware of the risks that may occur in these issues and take necessary precautions. It is recommended that qualitative studies and experimental studies should be conducted to determine the causes and coping strategies affecting the fatigue level and the quality of handover effectiveness of emergency department nurses.

Ethics Committee Approval: The Ethics Committee of Kayseri University (ApprovalNo: 60, Date: 04.10.2021)

Informed Consent: Written informed consent was obtained from all nurses participating in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept-AK; Design-AK; Supervision-AK; Resources-AK; Materials-AK; Data Collection and/or Processing-AK; Analysis and/or Interpretation-AK; Literature Search-AK; Writing Manuscript-AK; Critical Review-AK.

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Teşekkür: Yazar, bu çalışmaya katılan tüm hemşirelere teşekkür eder.

REFERENCES

1. Yudiah W, Yudianto K, Prawesti A. Fatigue and work satisfaction of emergency nurses in Bandung, West Java, Indonesia. *Belitung Nurs J.* 2018;4(6):602-611. doi:10.33546/bnj.558
2. Clopton EL, Hyrkäs EK. Modeling emergency department nursing workload in real time: An exploratory study. *Int Emerg Nurs.* 2020; 48:100793. doi:10.1016/j.ienj.2019.100793
3. Wolf LA, Perhats C, Delao A, Martinovich Z. The effect of reported sleep, perceived fatigue, and sleepiness on cognitive performance in a sample of emergency nurses. *J Nurs Admin.* 2017; 47(1):41-49. doi:10.1097/NNA.0000000000000435
4. Sadeghniaat-Haghighi K, Yazdi Z. Fatigue management in the workplace. *Ind Psychiatry J.* 2015; 24(1):12-17. doi:10.4103/0972-6748.160915
5. Staggers N, Blaz JW. Research on nursing handoffs for medical and surgical settings: An integrative review. *J Adv Nurs.* 2013; 69:247-262. doi:10.1111/j.1365-2648.2012.06087.x
6. Malekzadeh J, Mazluom SR, Etezadi T, Tasseri A. A standardized shift handover protocol: Improving nurses' safe practice in intensive care unit. *J Caring Sci.* 2013; 2(3):177-185. doi:10.5681/jcs.2013.022
7. Cohen M, Hillgoss P. The published literature on handoffs in hospitals: Deficiencies identified in an extensive review. *Qual Saf Health Care.* 2010; 19(6):493-497. doi:10.1136/qshc.2009.033480
8. Randell R, Wilson S, Woodward P. The importance of the verbal shift handover report: A multi-site case study. *Int J Med Inform.* 2011; 80(11):803-812. doi:10.1016/j.ijmedinf.2011.08.006
9. Fealy G, Donnelly S, Doyle G, et al. Clinical handover practices among healthcare practitioners in acute care services: A qualitative study. *J Clin Nurs.* 2019; 28(1-2):80-88. doi:10.1111/jocn.14643
10. Thomson H, Tourangeau A, Jeffs L, Puts M. Factors affecting quality of nurse shift handover in the emergency department. *J Adv Nurs.* 2018; 74(4):876-886. doi:10.1111/jan.13499
11. Birmingham P, Buffum MD, Blegen MA, Lyndon A. Handoffs and patient safety: Grasping the story and painting a full picture. *West J Nurs Res.* 2015; 37(11):1458-1478. doi:10.1177/0193945914539052
12. Querstret D, O'Brien K, Skene DJ, Maben J. Improving fatigue risk management in healthcare: a scoping review of sleep-related/fatigue-management interventions for nurses and midwives (reprint). *Int J Nurs Stud.* 2020; 112:103745. doi:10.1016/j.ijnurstu.2020.103745
13. Moon T, Gonzales M, Woods A, Fox PE. Improving the quality of the operating room to intensive care unit handover at an urban teaching hospital through a bundled intervention. *J Clin Anesth.* 2016; 31:5-12. doi:10.1016/j.jclinane.2016.01.001
14. Kerr D, Lu S, McKinlay L, Fuller C. Examination of current handover practice: Evidence to support changing the ritual. *Int J Nurs Pract.* 2011; 17(4):342-350. doi:10.1111/j.1440-172X.2011.01947.x
15. Funk E, Taicher B, Thompson J, Iannello K, Morgan B, Hawks S. Structured handover in the pediatric postanesthesia care unit. *J Perianesth Nurs.* 2016; 31(1):63-72. doi:10.1016/j.jpnan.2014.07.015
16. Tuna R, Dalli B. The Turkish version of the handover evaluation scale: A validity and reliability study. *Int J Nurs Pract.* 2019; 25(6):e12787. doi:10.1111/ijn.12787
17. Labrague LJ. Pandemic fatigue and clinical nurses' mental health, sleep quality and job contentment during the covid-19 pandemic: The mediating role of resilience. *J Nurs Manag.* 2021; 29(7):1992-2001. doi:10.1111/jonm.13383
18. Cohen J. Statistical power analysis for the behavioral sciences. 2nd edn. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.
19. Çelik S, Taşdemir N, Kurt A, İlgezdi E, Kubalas Ö. Fatigue in intensive care nurses and related factors. *Int J Occup Environ Med.* 2017; 8(4):199-206. doi:10.15171/ijoem.2017.1137
20. Ergin G, Yildirim Y. A validity and reliability study of the Turkish Checklist Individual Strength (CIS) questionnaire in musculoskeletal physical therapy patients. *Physiother Theory Pract.* 2012; 28(8):624-632. doi:10.3109/09593985.2011.654321
21. Yu F, Somerville D, King A. Exploring the impact of 12-hour shifts on nurse fatigue in intensive care units. *Appl Nurs Res.* 2019; 50:151191. doi:10.1016/j.apnr.2019.151191.
22. Vanhaecht K, Seys D, Bruyneel L, et al. COVID-19 is

- having a destructive impact on health-care workers' mental well-being. *Int J Qual Health Care*. 2021; 33(1):mzaa158. doi:10.1093/intqhc/mzaa158
23. AbuRuz E, Hayeah HM. Insomnia induced by night shift work is associated with anxiety, depression, and fatigue, among critical care nurses. *Adv Stud Biol*. 2017; 9(3):137-156. doi:10.12988/asb.2017.738
 24. Estryn-Béhar M, Van der Heijden BI. Effects of extended work shifts on employee fatigue, health, satisfaction, work/family balance, and patient safety. *Work*. 2012; 41(1):4283-4290. doi:10.3233/WOR-2012-0724-4283
 25. Steege LM, Rainbow JG. Fatigue in hospital nurses - "Supernurse" culture is a barrier to addressing problems: A qualitative interview study. *Int J Nurs Stud*. 2017; 67:20-28. doi:10.1016/j.ijnurstu.2016.11.014
 26. Dewanti NP, Jingga NA, Wahyudiono YDA. The relationship between work shifts and work environment with nurse fatigue in the emergency department. *The Indonesian Journal of Occupational Safety and Health*. 2022; 11(2):178-186. doi:10.20473/ijosh.v11i2.2022.178-186
 27. Garosi E, Najafi S, Mazloum A, Danesh MK, Abedi Z. Relationship between work ability index and fatigue among Iranian. *Crit Care Nurse*. 2018; 10(3):135-142.
 28. Şapulu Alakan Y, Akansel N. Investigation of studies related to fatigue in intensive care nurses. *Hacettepe University Faculty of Health Sciences Journal*. 2021; 8(2):249-271. doi:10.21020/husbfd.804308
 29. Chen J, Davis KG, Daraiseh NM, Pan W, Davis LS. Fatigue and recovery in 12-hour dayshift hospital nurses. *J Nurs Manage*. 2014; 22(5):593-603. doi:10.1111/jonm.12062
 30. Krzemińska S, Guzik N, Borodzicz A, Bąk E, Arendarczyk M. Assessing fatigue among icu nurses using the yoshitake fatigue questionnaire-A pilot study. *J Educ Health Sport*. 2018; 8(6):103-112. doi:10.5281/zenodo.1252500
 31. Maulina N, Syafitri L. Hubungan usia, lama bekerja dan durasi kerja dengan keluhan kelelahan mata pada penjahit sektor usaha informal di kecamatan banda sakti kota lhokseumawe tahun 2018. *J AVerrous*. 2019; 5(2):44-58. doi:10.29103/averrous.v5i2.2080
 32. Redley B, Botti M, Wood B, Bucknall T. Interprofessional communication supporting clinical hand-over in emergency departments: An observation study. *Australas Emerg Nurs J*. 2017; 20(3):122-130. doi:10.1016/j.aenj.2017.05.003
 33. Heryana A, Mahadewi EP, Buwana T. Studi beban kerja perawat IGD puskesmas kecamatan kalideres jakarta barat menggunakan metode work sampling. *Indonesian Journal of Nursing Health Science*. 2020; 5(2):86-93.
 34. Doğan R, Bayraktar O. The relationship between mobbing and job performance in the private health sector: A research on nurses. *Journal of Economics Business and Finance Research*. 2020; 2(1):53-67. doi:10.38009/ekimad.691218
 35. Sharma J, Dhar RL, Tyagi A. Stress as a mediator between work-family conflict and psychological health among the nursing staff: Moderating role of emotional intelligence. *Appl Nurs Res*. 2016; 30:268-275. doi:10.1016/j.apnr.2015.01.010
 36. Tuğrul E, Şahbaz M. Nurses' practice and opinions about nursing handover. *Journal of Adnan Menderes University Health Sciences Faculty*. 2021; 5(1):13-25. doi:10.46237/amusbfd.717408
 37. Tobiano G, Bucknall T, Sladdin I, Whitty JA, Chaboyer W. Patient participation in nursing bedside handover: A systematic mixed-methods review. *Int J Nurs Stud*. 2018; 77:243-258. doi:10.1016/j.ijnurstu.2017.10.014
 38. Welsh CA, Flanagan ME, Ebright P. Barriers and facilitators to nursing handoffs: Recommendations for redesign. *Nurs Outlook*. 2010; 58(3):148-154. doi:10.1016/j.outlook.2009.10.005
 39. Toeima E, Morris E. Improving patients' handover. *Obstet Gynaecol Reprod Med*. 2013; 23(7):221-223. doi:10.1016/j.ogrm.2013.04.003