

ORIGINAL ARTICLE

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Fatigue and burnout in nurses during the COVID-19 pandemic

 Hatice Pekince¹,  Hakime Aslan²¹Firat University, Kovancilar Vocational School, Elazığ, Turkey²Inonu University, Department of Fundamentals of Nursing, Faculty of Nursing, Malatya, Turkey

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Abstract

This research was conducted to assess the fatigue and burnout levels of nurses and the factors affecting those levels during the COVID-19 pandemic. This descriptive-correlational research was carried out with 270 nurses at a university hospital in the eastern region of Turkey. To collect data, 'Information Form, 'The Checklist Individual Strength' and 'The Maslach Burnout Inventory' were used. It was found that the mean age of the nurses who participated in this study was 27.5 ± 5.7 years, 73.3% were female, 82.6% were bachelor graduates, 63% were single, 35.2% worked in intensive care units. It was found that the nurses obtained a total score of 94.6 ± 20.5 on the CIS and 48.4 ± 8.3 points on the MBI. Nurses' fatigue levels were high and burnout levels were moderate. A positive correlation was found between fatigue and burnout ($r: .288^{**}$, $p=.000$). The difference between gender, weekly working hours, duration of professional experience (not with fatigue) and working unit and fatigue and burnout was found to be statistically significant ($p<0.05$). It was found that various aspects of the COVID-19 pandemic have increased fatigue and burnout.

Keywords: Fatigue, burnout, COVID-19, nurse

Introduction

The coronavirus disease (COVID-19) originated in the city of Wuhan, one of China's largest industrial and commercial centres, in early December 2019 and spread rapidly around the world. While the COVID-19 pandemic is not the first pandemic, it is the most important outbreak to date [1-3]. Countries have taken several measures to fight the COVID-19 pandemic, which continues to affect the whole world. Thanks to these measures, the number of cases has decreased, especially in the summer months. However, since the social measures have not been adequately controlled, the number of cases and deaths has begun to increase rapidly [4-6]. The World Health Organization (WHO) reported the number of confirmed cases and deaths related to COVID-19 at 173.674.509 and [3]. 744.408 respectively, as

of June, 2021 [7]. In Turkey, on the other hand, the Ministry of Health announced that there were 5.300.236 confirmed cases of COVID-19 and 48.341 deaths as of June, 2021 [8].

The prevalence, high morbidity and mortality rates of COVID-19 in the general population have disabled our accustomed coping strategies, creating an unprecedented burden on healthcare professionals worldwide [9]. COVID-19 caused an increase in new cases of depression and anxiety, an increase in the severity of pre-existing mental health symptoms and challenged health care providers both physically and psychologically [10]. Lack of medical and protective equipment, long working hours, changes in sleep and work-life patterns, and occupational hazards associated with virus transmission have contributed to physical and mental fatigue, stress and anxiety, and burnout [11]. Nurses are witnessing a more rapid impairment of health in patients than they are used to, providing end of life care more frequently, working in different units than they are used to, working for longer periods and without breaks, struggling with a lack of adequate personal protective equipment (PPE) such as masks/face shields, and coping with situations that create severe moral distress and fatigue, such as having to decide which patients should be given intensive care beds [12-14]. All of these factors lead nurses to experience high levels

*Corresponding Author: Hakime Aslan, Inonu University, Department of Fundamentals of Nursing, Faculty of Nursing, Malatya, Turkey
E-mail: hakime.aslan@inonu.edu.tr

of fatigue and stress, and to face risks that may lead to burnout [15]. Burnout, which is closely related to fatigue, can develop as a result of being constantly exposed to occupational stressors in the workplace [16]. During the pandemic process, increasing patient safety and quality of work life for health workers has become the most difficult issues. In order to cope with these difficulties, it is necessary to examine in detail the factors that cause burnout and fatigue [17].

This research was conducted to assess the level of fatigue and burnout of nurses and the factors affecting them during the COVID-19 pandemic on nurses working in a university hospital.

Materials and Methods

Design

This is a descriptive and correlational study.

Setting and Participants

This research was carried out in November and December 2020 at a university hospital in the eastern region of Turkey. The population of the research comprised 950 nurses. The sample of the study comprised 270 nurses with 0.80 representation power, 0.05 error and 0.95 confidence interval in the power analysis. It was aimed to reach more nurses with the thought that there would be loss during data collection. Nurses who did not want to participate in the study (n=52), those who were called but could not be reached (n=20) and those who filled out the form incompletely or incorrectly were excluded from the study. When the sample size of 270 nurses was reached, the study was completed with this number.

Data Collection

To collect data, three different forms were used: 'Information Form', which evaluates the socio-demographic characteristics of the nurses, 'The Checklist Individual Strength (CIS) Questionnaire' and 'The Maslach Burnout Inventory (MBI)'. Scale forms were prepared online by the researchers. The data collection form link was sent to the nurses via WhatsApp. Only complete and correct answers have been analysed. Filling out the scales took about 10-15 minutes.

Data Collection Tools

Information form: This form consists of nine items concerning nurses' socio-demographic characteristics and their experience with working conditions, such as age, gender, marital status, education level, department, occupation period, type of shift, weekly working hours and satisfaction with the department worked. In addition, this form includes six questions about the experiences of nurses during the COVID-19 pandemic.

The Checklist Individual Strength (CIS) Questionnaire

To measure the overall fatigue levels of the participants, we used the CIS, which was developed by Beurskens (2000) and adapted into Turkish by Ergin and Yıldırım [18]. The highest score that can be obtained from the scale is 140. Higher scores correspond to higher levels of fatigue. The CIS, which uses a 7-point Likert scoring scheme, consists of 20 statements on fatigue-related

problems that respondents might have experienced in the previous 2 weeks. The Cronbach's alpha was found to be 0.87, while we found it to be .90 in this study.

Maslach Burnout Inventory (MBI)

This assessment instrument was developed by Maslach and Jackson in 1981, and its Turkish psychometric evaluation study was performed by Ergin [19]. It comprises 22 items and three subscales: emotional exhaustion (EE), depersonalization (DP) and personal accomplishment (PA). The items on the MBI are rated as 'never=0, rarely=1, sometimes=2, often=3, and always=4'. While subscale items are scored as above for emotional exhaustion and depersonalization, items of personal achievement are reverse scored (never=4, always=0). The scores that can be obtained from the subscales of the inventory vary between (0-36) for EE, (0-20) for DP, and (0-32) for PA. While EE and DP subscales consist of negative statements, PA comprises positive statements. Higher scores on the EE and DP subscales correspond to increased burnout, while higher scores on the PA subscale mean decreased burnout. The Cronbach's alpha coefficients of the subscales were found to be 0.83, 0.72 and 0.65 for EE, PA and DP, respectively [19]. In this study, the scale's Cronbach's alpha was found to be 0.82, and the subscales were found to be 0.87, 0.79 and 0.75 for EE, PA and DP, respectively.

Data Analysis

All data collected were evaluated by the Statistical Package for the Social Sciences (SPSS) 23.0 statistics package program. The Kolmogorov-Smirnov test was used to assess the suitability of the data for normal distribution. Numbers, percentages, means and standard deviation were used in the evaluation of the nurses' descriptive characteristics and opinions on working conditions amidst the COVID-19 pandemic. Additionally, an independent samples t-test, one-way ANOVA, the Kruskal-Wallis H, correlation tests and linear regression analysis were used to evaluate the data. The significance level was accepted as $p < 0.05$ while interpreting the results.

Ethical Declarations: Institutional permission was obtained from the University Hospital Chief Physician, and ethical approval was obtained from the Inonu University Health Sciences Scientific Research and Publication Ethics Committee (Decision no: 2020/872). Written informed consent was received from subjects who participated in this study. Information about the research was given on the research questionnaire and an area for confirming participation in the research was created. Nurses who filled/confirmed this field were able to answer the questions. Filling in the confirmation field indicates that written consent has been obtained.

Results

The mean age of the nurses who participated in this study was 27.5 ± 5.7 years; 73.3% were female, 82.6% were bachelor graduates, 63% were single, 35.2% worked in intensive care units, 32.2% had between 2 and 5 years of professional experience, 74.8% worked both day and night shifts, and 56.7% worked more than 40 hours per week. Table 1 shows detailed information on the socio-demographic characteristics of the nurses (Table 1).

Table 1. Socio-demographic characteristics of nurses

Socio-demographic variables		Number (N)	Percentage (%)
Age		X±SD 27.5±5.7	
Gender	Female	198	73.3
	Male	72	26.7
Educational Level	Vocational High School	13	4.8
	Associate degree	18	6.7
	Bachelor	223	82.6
	Post-graduate	16	5.9
Marital Status	Married	100	37.0
	Single	170	63.0
Working unit	Internal / surgical service	55	20.4
	Intensive care unit	95	35.2
	Emergency department	63	23.3
	Pandemic services	19	7.0
	Other	38	14.1
Duration of professional experience	1 year and below	85	31.5
	From 2 to 5 year	87	32.2
	From 6 to 10 year	65	24.1
	From 11 to 15 year	16	5.9
	16 year and above	17	6.3
Type of shift	Fixed daytime shifts	68	25.2
	Mixed day-night shift	202	74.8
Weekly working hours	32-40 hours	117	43.3
	41 hours and above	153	56.7
Are you satisfied with the department you work?	Yes	98	36.3
	No	53	19.6
	Partially satisfied	119	44.1

X: Mean, SD: Standard Deviation, N: number

Table 2 shows nurses' experiences during the pandemic period. For this period, the following results were found: 89.6% of the nurses' family and social life were affected; 29.3% had a coronavirus diagnosis; 70% were anxious about caring for COVID-19 patients; physical symptoms, which were experienced the most during the COVID-19 pandemic, was fatigue with 46.2%; the matter that most fatigued the nurses was caring for COVID-19 patients; and 51.8% experienced excessive sweating and itching due to the

protective equipment they used (Table 2).

It was found that the nurses obtained a total score of 94.6 ± 20.5 from the Checklist Individual Strength (CIS) Questionnaire, and their fatigue levels were determined to be very high. It was observed that their subjective fatigue perception was very high, while their concentration and motivation levels were intermediate and their physical activity level was high. Nurses scored 48.4 ± 8.3

points on the burnout inventory, and indicating that their burnout level was above the medium level. The higher scores on emotional exhaustion and depersonalization correspond to increased burnout. Considering that the highest score on the emotional exhaustion subscale is 36.0 points, it was seen that the nurses' mean scores were above the average level (19.3 ± 5.9). Considering that the highest score on the depersonalization subscale is 20.0 points, it was seen that the nurses' depersonalization levels were low (6.8 ± 3.7). The low scores on the depersonalization subscale—which refers to a negative attitude towards patients and a negative detachment from work—are important for the quality of nursing care provided. The personal accomplishment levels of the nurses were found to be above the average (19.7 ± 4.2) (Table 3).

Examining the correlation between fatigue level and burnout revealed a moderate, positive and statistically significant relationship between them ($r: 0.288^{**}$, $p=0.000$). A positive and

significant relationship was found between the subscales of Subjective Fatigue, Concentration, Motivation, Physical Activity, and the subscales of Emotional Exhaustion and Depersonalization, while a negative significant relationship was found with the Personal Accomplishment subscale. It was found that the level of personal accomplishment decreases as the level of fatigue increases. Table 4 shows the relationship between the CIS and MBI (Table 4).

Table 5 shows the comparison of demographic variables and mean scores of the scales. A positive and weak relationship was found between age, fatigue and burnout; however, the difference between them was not found to be statistically insignificant ($p>0.05$). The difference between gender, duration of professional experience (not with fatigue), weekly working hours and working unit and fatigue and burnout was found to be statistically significant ($p<0.05$).

Table 2. Nurses' experiences regarding the pandemic period

Variables		Number (N)	Percentage
Has the pandemic period affected your family and social life?	Yes	242	89.6
	No	3	1.1
	Partially affected	25	9.3
Have you been diagnosed with coronavirus?	Yes	79	29.3
	No	191	70.7
Are you anxious about caring for COVID-19 patients?	Yes	189	70.0
	No	81	30.0
What physical symptom have you experienced the most during pandemic process?*	Fatigue	125	46.2
	Back and/or leg pain	56	20.7
	Head and neck pain	37	10.0
	Sleeplessness	75	27.7
What was the most fatiguing thing for you during the pandemic?*	Caring for COVID-19 patients	132	48.8
	Rotations to pandemic services	109	40.4
	Long working hours	119	44.1
	Excess number of patients Other	95	35.1
What problems have you experienced due to the protective equipment you used in the department? *		34	12.6
	Excessive sweating and itching due to coverall/apron	140	51.8
	Skin damage on face and/or behind the ears	89	32.9
	Headache	68	25.1
	Other	48	17.8

*More than one answer was given

Table 3. Nurses' total mean scores of the checklist individual strength questionnaire (CIS) and the Maslach Burnout Inventory (MBI)

Scale	Min-Max Points	X±SD
Subjective fatigue	12.0-56.0	42.5±10.6
Concentration	8.0-35.0	23.1±6.1
Motivation	6.0-28.0	16.8±4.6
Physical activity	3.0-24.0	21.0±12.1
Total Score of the CIS	38.0-140.0	94.6±20.5
Emotional Exhaustion	2.0-32.0	19.3±5.9
Depersonalization	0.0-17.0	6.8±3.7
Personal accomplishment	6.0-30.0	19.7±4.2
Total Score of the Maslach Burnout Inventory	17.0-69.0	48.4±8.3

X: Mean, SD: Standard Deviation

Table 4. Relationship between the CIS and MBI

	Emotional Exhaustion	Depersonalization	Personal accomplishment	Maslach Burnout Inventory
Subjective fatigue	r=.473**	r=.198**	r= -.159**	r=.272**
	p=.000	p=.000	p=.000	p=.000
Concentration	r=.463**	r=.214**	r= -.371**	r=.267**
	p=.000	p=.000	p=.000	p=.000
Motivation	r=.345**	r=.209**	r= -.394**	r=.169**
	p=.000	p=.001	p=.000	p=.005
Physical activity	r=.321**	r=.171**	r= -.337**	r=.188*
	p=.000	p=.003	p=.000	p=.001
CIS	r=.529**	r=.194**	r= -.404**	r=.288**
	p=.000	p=.001	p=.000	p=.000

r: Correlation *p<0.05, **<0.001

The Linear Regression Enter method was used to evaluate the variables affecting fatigue and burnout. For the method where the total score of the CIS was the dependent variable, gender, weekly working hours, working unit, family and social life being affected due to the pandemic, anxiety about caring for COVID-19 patients and problems suffered from protective equipment were found to be the factors affecting fatigue. It was found that 36.5% of the total variance in the dependent variable of the CIS was explained by these variables, and the result was found to be statistically significant (p<0.001).

In the model where the Maslach Burnout Inventory total score was the dependent variable, gender, weekly working hours, working unit, family and social life being affected due to the pandemic and anxiety about caring for COVID-19 patients were found to affect burnout. It was found that 29.9% of the total variance in the dependent variable of the burnout inventory was explained by these variables, and the result was found to be statistically significant (p<0.001) (Table 6).

Table 5. Comparison of nurses' socio-demographic characteristics and mean scores of the CIS and MBI

Socio-demographic variables		CIS X±SD	MBI X±SD
Age		27.5±5.7	27.5±5.7
		r=-0.113	r=0.138
		p=0.173	p=0.056
Gender	Female	98.2±21.2	50.5±7.9
		92.9±18.3	46.6±8.3
	Male	t=-4.822	t=-3.569
		p=0.001*	p=0.010*
Educational Level	Vocational High School	97.3±18.2	50.0±10.3
	Associate degree	95.7±15.5	46.2±7.0
	Bachelor	93.8±21.0	48.3±8.1
	Post-graduate	102.5±18.9	51.0±10.9
		KW=1.757	KW=3.764
		p=0.624	p=0.288
Marital Status	Married	96.9±22.8	49.1±8.1
		94.6±18.8	47.1±8.7
	Single	t=-1.210	t=-1.928
		p=0.288	p=0.055
Working unit	Internal / surgical service	92.0±21.0	46.3±8.3
	Intensive care unit	101.3±20.2	54.6±8.6
	Emergency department	95.3±20.8	50.3±6.6
	Pandemic services	102.7±19.0	56.3±8.5
	Other	94.1±21.5	48.8±8.2
		KW=1.534	KW=2.671
Duration of professional experience		p=0.020*	p=0.032*
	1 year and below	94.0±22.0	46.5±8.9
	From 2 to 5 year	95.1±19.6	49.2±8.7
	From 6 to 10 year	96.4±18.3	48.3±6.7
	From 11 to 15 year	94.8±15.9	53.8±8.0
	16 year and above	97.1±20.3	52.2±8.9
		KW=1.504	KW=5.375
Type of shift	Fixed daytime shifts	91.2±26.0	47.7±7.9
		95.0±18.8	48.3±8.5
	Mixed day-night shift	t=-0.465	t=-1.265
		p=0.623	p=0.007
Weekly working hours	32-40 hours	91.0±22.5	44.7±8.2
		96.5±18.7	48.6±8.3
	40 hours and above	t=-1.812	t=-2.907
		p=0.007*	p=0.004*
Are you satisfied with the department you work?	Yes	94.9±22.0	49.0±9.4
	No	98.7±13.6	51.0±6.7
	Partially satisfied	96.8±18.8	50.0±7.1
		F=19.69	F=14.29
		p=0.210	p=0.502

*p<0.05, X: Mean, SD: Standard Deviation, t: Independent sample t test, KW: Kruskal-Wallis Test, r: Correlation

Table 6. Examining the factors affecting fatigue and burnout using regression analysis

Model	Checklist Individual Strength (CIS)					Maslach Burnout Inventory (MBI)				
	Unstandardized Coefficients		Standardized Coefficients			Unstandardized Coefficients		Standardized Coefficients		
	B	SE	Beta	t	Sig.	B	SE	Beta	t	Sig.
(Constant)	84.997	12.967		6.555	.000	74.686	5.605		6.189	.000
Age	.768	.468	.206	1.643	.102	.051	.202	.033	.250	.802
Gender	-5.122	2.806	-.110	-1.825	.029	2.625	1.213	.139	2.165	.031
Educational level	2.158	2.315	.058	.932	.352	1.011	1.001	.067	1.010	.313
Marital status	3.947	2.820	.098	1.400	.113	.377	1.219	.023	.309	.758
Working unit	4.257	1.271	1.161	3.310	.000	3.156	1.292	.019	1.263	.000
Duration of professional experience	-.843	.398	-.153	-2.117	.065	1.079	.264	.111	.782	.145
Type of shift	-.458	3.216	-.010	-.142	.887	.025	.172	.011	.147	.883
Weekly working hours	3.757	1.376	.164	2.730	.007	1.179	1.390	.410	1.128	.049
Are you satisfied with the department you work?	.236	.730	.020	.323	.747	.249	.316	-.051	-.788	.431
Has the pandemic period affected your family and social life?	-7.861	2.156	-.225	-3.646	.000	1.825	.415	.208	1.638	.003
Have you been diagnosed with coronavirus?	1.509	1.371	.073	1.101	.272	-.335	1.022	-.020	-.328	.743
Are you anxious about caring for COVID-19 patients?	3.694	1.056	.043	1.657	.010	-2.455	.456	-.169	-.998	.019
Most experienced physical symptom	.694	1.056	.043	.657	.512	.271	.595	.243	.817	.248
Factors that cause fatigue	-1.373	.743	-.112	-1.849	.066	.238	.321	.048	.742	.459
Having problems due to protective equipment	-8.707	2.364	-.210	-3.683	.000	-1.408	.429	-.367	-1.952	.052
F:24.494 Sig:.000b R:.642a Adjusted R2: .365						F:23.449 Sig: .000b R:.599a Adjusted R2:.299				

a. Dependent Variable: The Checklist Individual Strength (CIS) Questionnaire, The Maslach Burnout Inventory (MBI)

b. Predictors: (Constant), Age, Gender, Educational Level, Marital status, Working unit, Duration of professional experience, Type of shift, Weekly working hours, Are you satisfied with the department you work?, Has the pandemic period affected your family and social life?, Have you been diagnosed with coronavirus?, Are you anxious about caring for COVID-19 patients?, Most experienced physical symptom, Factors that cause fatigue amidst COVID-19 pandemic, Having problems due to protective equipment

Discussion

The results obtained in this study, in which we evaluated fatigue and burnout in nurses, are now discussed with references to the relevant literature. In this study, it was determined that the nurses obtained a total score of 94.6 ± 20.5 on CIS and their fatigue levels were found to be at very high levels. It was observed that their subjective fatigue perception was very high, their concentration and motivation levels were intermediate, and their physical activity level was high. Chew et al. (2020) from Singapore and India found the prevalence of fatigue or lethargy in healthcare providers to be 26.6% [20]. Teng et al. found a fatigue level of 73.7% among 2614 frontline workers fighting COVID-19 [21]. Liu et al. (2021) found that 67.3% of nursing students reported fatigue [22]. Hou et al. found that the prevalence of fatigue among non-frontline health care workers was 56.7% [23]. Studies of the SARS pandemic reveal a prevalence of fatigue of 22.1%–70.3% [24, 25, 26]. Since the scale used to measure fatigue in this study did not have a cut-off score, the level of fatigue cannot be given as a percentage. However, it was observed that, according to the average score obtained, the fatigue levels of the nurses were high. This finding is consistent with previous research results. During the COVID-19 pandemic, an increase in the number of patients, excessive workload, insomnia, an increase in working hours and many other stress factors may have caused healthcare workers to experience more fatigue.

In this study, the difference between the CIS scale and gender, weekly working hours, and working unit was found to be statistically significant. The fatigue levels of female respondents, those who worked more than 40 hours per week, and those who were working in the pandemic services were found to be higher. Bastorzek and colleagues found that women had significantly higher mean scores for daily life fatigue compared to men during the COVID-19 pandemic [27]. Liu et al. and Raftopoulos et al. stated that women were more likely to suffer from fatigue than men [28, 29]. These findings support our own research findings. Sagherian et al. found that nurses who worked for ≥ 40 hours per week experienced significantly higher levels of acute and chronic fatigue than their colleagues who worked fewer hours [30]. In the literature, it was found that insufficient sleep, overtime, and long shifts are factors that increase fatigue [31, 32]. Studies have shown that a limited degree of recovery in patients and high-level stress during shift lead fatigue to increase and psychological well-being to reduce [33, 34]. Due to increased working hours, nurses stay up much longer and have to provide care to patients whose general condition is severe, intubated and infected. We think that increased workload and insufficient rest time may be important factors that increase fatigue.

In this study, significant difference was found between the working unit and the CIS. It was observed that fatigue levels were higher in nurses working in pandemic services and intensive care units. A U.S. study conducted during the pandemic period supports our research findings: nurses who care for COVID-19 patients have higher levels of fatigue than other nurses [30]. Our study found that the physical complaints of nurses were caused mostly by fatigue, and that the primary reason for this is caring for COVID-19 patients. In a study conducted on nurses working in intensive care units, it was determined that night shifts and sleeplessness were

the leading reasons for nurses' fatigue. In answer to the question, 'How would you express your tiredness?', 45% stated fatigue and burnout [35]. In this study, it was determined that family and social life being affected by the pandemic, the anxiety of caring for COVID-19 patients and problems experienced due to protective equipment were other factors affecting fatigue. When nurses care for a COVID-19 patient, fatigue may also increase due to concerns about contracting the virus, the patient being intubated and the need to administer many machine and drug treatments. In addition, nurses must wear all protective equipment when caring for COVID-19 patients. It is believed that this equipment, which can cause excessive sweating and prohibit comfortable movement, and which requires effort to wear and remove, may increase fatigue. However, more research needs to be done to identify the factors that affect fatigue, and these issues need to be addressed again.

We found that the nurses in our study experienced moderate burnout. In the study by Yüncü and Yılan, 63.8% of the healthcare providers responded 'yes' to the question, 'Do you think you have experienced burnout amidst the COVID-19 pandemic?' [36]. A systematic review and meta-analysis of nurses' burnout during pandemic detected that the overall prevalence of EE was 34.1%, that of DP was 12.6% and lack of PA was 15.2% [37]. Amidst the COVID-19 pandemic in Spain, healthcare providers were found to experience moderate to high levels of compassion fatigue and burnout [38]. Cao et al. stated that in China, healthcare providers were found to experience high levels of stress, although their burnout levels were not very high [39]. In the studies conducted in the literature, it has been determined that the level of burnout among health workers is moderate to high level [37-39]. These results which are similar to our study. However, Kaushik stated that "Globally, healthcare worker burnout may be reaching a tipping point with the second/third wave of the pandemic, new contagious, virulent mutant viruses, the rising death toll, and slow vaccine rollout" [40]. It is thought that nurses' increased weekly working hours during the pandemic and their inability to use annual leave may have increased burnout.

In our study, we found that gender, weekly working hours, occupation period and working unit were the factors that affect burnout. In our study, the burnout levels of female nurses were higher than those of males. Lai et al. (2020) determined that the mental health symptoms of women, nurses, and frontline workers in the pandemic were more severe than those of other healthcare workers [41]. Chen et al. found that women and those working in intensive care or COVID-19 departments had higher levels of emotional exhaustion [42]. Many studies conducted during the pandemic determined that the psychological effects of this process are much more severe among females [38, 42]. Our research finding is consistent with the literature. It is thought that, in addition to stress factors such as women's emotional structures, child care and work-family balance, the versatile stressors brought about by the pandemic may increase burnout in women.

In this study, the burnout levels of nurses who were worked the pandemic services were found to be higher. Chen et al. found that nurses working in intensive care and COVID-19 departments had higher levels of emotional exhaustion [42]. Li et al. found that women health workers in isolation wards presented higher rates of psychological stress [43]. Poor working conditions are a major risk

factor for work-related stress and job dissatisfaction, resulting in high levels of burnout among nurses [44, 45]. Satisfaction with the department worked in is of great importance in providing better quality nursing care. It is thought that assignment to isolation services, the adaptation process for isolation services and the burden of caring for isolated patients may have increased the burnout of nurses.

In our study, a significant relationship was found between occupation period and the burnout levels of nurses, and it was determined that burnout increases as occupation period increases. The burnout levels of new graduates were lower than others. Li et al. noted that, among the sociodemographic characteristics, those with more than 10 years of work experience and two or more children are susceptible to stress, depression and anxiety [43]. In this study, it was observed that the burnout level of nurses with longer professional experience was higher. It is thought that the older age of the nurses with long professional experience, combined with the fatigue brought about by long service, may have increased burnout.

In our study, we found that long weekly working hours (40 hours and above) had a significant effect on fatigue and burnout. Similarly, Galanis et al. found that, like increased workload and increased working times, poor working conditions increase the level of burnout among nurses [37]. The WHO has emphasised that longer duty hours, emotional problems, fatigue, burnout, and healthcare workers' physical and mental complaints pose a risk amidst the COVID-19 pandemic [46]. It is thought that not listening to nurses with longer working hours and assigning long hours of care to nurses caring for at-risk patients increase burnout.

Anxiety about caring for COVID-19 patients was found to be another factor affecting the burnout levels of nurses. Teng et al. found that those who were anxious about being infected experienced more severe depression, anxiety, and mental and physical fatigue than those who were not anxious about being infected [21]. Elbay et al. found that caring for an increasing number of COVID-19 patients increased depression, anxiety and stress [47]. Kisely et al. determined that nurses have extra concerns about the COVID-19 outbreak, such as lack of personal protective equipment and fear of being exposed at work, spreading the virus and taking the virus home to their close family members [48]. Nurses working in high-risk clinical environments (such as pandemic clinics) have been found to have higher levels of burnout [37]. Our research found that nurses have experienced overfatigue amidst the COVID-19 pandemic and that their burnout levels are also high. A positive significant relationship was observed between overall fatigue level and the burnout inventory ($r=.288$, $p=.000$). In other words, it was found that as fatigue increases, burnout also increases. Teng et al. found that all subscales of the Checklist Individual Strength (CIS) Questionnaire showed a significant correlation with anxiety and depression [21]. Our research findings are consistent with the literature.

Implications for Nursing Practice

The COVID-19 pandemic has affected healthcare providers all over the world, including nurses. Indeed, the pandemic has affected nurses more, adding greater strain to what is already a very

tiring and stressful profession. It has been observed that nurses have experienced overfatigue and that their burnout levels have increased. In addition to general problems—such as increasing numbers of patients and deaths and a shortage of personnel and equipment—various special problems, such as assignments to different departments and long working hours, have also increased fatigue and burnout. To maintain quality nursing care, it is very important to support nurses economically, mentally and socially and to improve their working conditions. Healthcare providers who protect their mental health in this period will increase the quality of their service and job satisfaction. To avoid fatigue and burnout, improved current working conditions, increased numbers of nurses, giving new graduate nurses the opportunity to express and realize themselves and supporting them with in-house training and seminars are of great importance.

Limitations

Collecting research data at a single hospital affects the generalizability of the results. This was the first limitation of our research. In addition, nurses' level of participation in the study was low, so collecting data by reaching nurses at their mobile numbers was another limitation. However, being the first study in Turkey to investigate nurses' fatigue and burnout amidst the COVID-19 pandemic is a strength of the study.

Conclusion

In conclusion, nurses' levels of fatigue and burnout were found to be at medium-high levels. It was determined that gender, weekly working hours, occupation period, satisfaction working unit and various situations related to the COVID-19 pandemic have increased fatigue and burnout. A significant positive correlation between fatigue and burnout was observed. Intermittent rest breaks can be arranged for nurses with long working hours. The assignment of nurses with long occupation periods to pandemic departments can be reduced. Additionally, we recommend that the Ministry of Health take the following steps: improve the working conditions of nurses, solve problems in accessing protective equipment, eliminate staff shortages, take restrictive measures to reduce disease transmission and raise public awareness about vaccination.

Conflict of interests

The authors declare that they have no competing interests.

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Ethical approval

Ethical approval was obtained from the Inonu University Health Sciences Scientific Research and Publication Ethics Committee (Decision no: 2020/872).

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