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The Effect of COVID-19 Pandemic on the Quality of Work Life, Workload, and Burnout in Intensive Care Nurses

COVID-19 Pandemi Döneminin Yoğun Bakım Hemşirelerinde İş Yaşamı Kalitesi, İş Yükü ve Tükenmişliğine Etkisi

ABSTRACT

Objective: To examine the quality of work-life, workload, and burnout in ICU nurses during the COVID-19 pandemic in Turkey.

Methods: A cross-sectional and descriptive study conducted. The data were collected with the Nurse Information Form, Quality of Nursing Work Life Scale, Individual Workload Perception Scale-Revised, and Burnout Measure-Short version. For a better understanding of the impact of the pandemic, nurses were asked to evaluate the questions on these scales twice, taking into account the working conditions/environment in the (1) pre-pandemic and (2) pandemic periods.

Results: A total of 249 nurses were included. Total and subscales of the scores indicated significantly lower quality of work life, high workload and burnout during the pandemic period compared to pre-pandemic (128.12±10.86 vs. 71.46±7.37 points for quality of life; 101.93±8.98 vs. 61.09±7.41 points for workload; 20.93±2.03 vs. 56.02±2.46 points for burnout; p=0.001 for all). A significant correlation was found between nurses' workload and burnout level and their work hours in the pandemic ICU, weekly work hours, and the nurse:patient ratio (p<0.05).

Conclusion: The COVID-19 caused ICU nurses to have higher workload and burnout and lower quality of work-life compared to the pre-pandemic period.

ÖZ

Amaç: COVID-19 pandemisi sırasında yoğun bakım hemşirelerinde iş yaşam kalitesi, iş yükü ve tükenmişliği incelemektir.

Yöntem: Araştırma, kesitsel ve tanımlayıcı türde yürütüldü. Veriler Hemşire Tanıtım Formu, Hemşirelik İş Yaşamı Kalitesi Ölçeği, Revize Bireysel İş Yükü Algı Ölçeği ve Tükenmişlik Ölçeği-Kısa Formu ile toplanmıştır. Pandeminin etkisinin daha iyi anlaşılabilmesi için hemşirelerden (1) pandemi öncesi ve (2) pandemi dönemindeki çalışma koşulları/ortamı dikkate alınarak bu ölçeklerdeki soruları iki kez değerlendirmeleri istenmiştir.

Bulgular: Araştırmaya 249 hemşire dâhil edildi. İş Yaşamı Kalitesi, İş Yükü ve Tükenmişlik ölçeklerinin genel ve alt ölçek toplam puanları, pandemi döneminde pandemi öncesine kıyasla anlamlı derecede daha düşüktü (iş yaşamı kalitesi için 128.12±10.86 puana karşı 71.46±7.37 puan; iş yükü için 101.93±8.98 puana karşı 101.93±8.98; tükenmişlik için 20.93±2.03 puana karşı 56.02±2.46 puan, tüm karşılaştırmalarda p = .001). Hemşirelerin iş yükü ve tükenmişlik düzeyi ile pandemi yoğun bakım ünitesindeki ortalama çalışma saatleri, haftalık çalışma saatleri ve hemşire: Hasta oranı arasında anlamlı ilişki saptandı (p <0.05).

Sonuç: COVID-19 pandemisi, pandemi öncesi döneme göre yoğun bakım hemşirelerinin daha fazla iş yükü ve tükenmişlik yaşamasına ve iş yaşam kalitesinin daha düşük olmasına neden olmuştur.

INTRODUCTION

Coronavirus disease-2019 (COVID-19) is an infectious disease that emerged in China in December 2019, was later declared a pandemic by the World Health Organization (WHO), and is still prevalent worldwide as well as in Turkey (Wu, Chen and Chan, 2020). At the time this article was written, 2 March 2022, there were over 437 million confirmed cases of COVID-19, and over 5,9 million deaths were reported to WHO globally (WHO, 2022a). The number of daily cases in Turkey was reported as 56,780 on the same date (WHO, 2022b). The pandemic process is still ongoing today (21.11.2022), and the total number of cases in the world has reached 634 million, with 6,5 million deaths (WHO, 2022c).

Symptoms of COVID-19 can be mild, moderate, or severe. Severe patients may present with severe respiratory tract infection (severe pneumonia), acute respiratory distress syndrome (ARDS), sepsis, septic shock, myocarditis, arrhythmia, cardiogenic shock, and multiple organ failure (Hajjar et al., 2021; Murthy, Gomersall and Fowler, 2020). The severe and fatal course of the disease in many cases led to the need for follow-up in intensive care units (ICUs). For this reason, especially ICU nurses continue to work under intense stress and workload since the beginning of the pandemic (Mo et al, 2020; Rattray et al., 2021; Shen, Zou, Zhong, Yan and Li, 2020).

It has been observed that the COVID-19 pandemic has physical, psychosocial, and politico-economic effects on ICU nurses all over the world, including our country (da Silva and Barbosa, 2021; Duru, 2021; Sezgin, Dost and Esin, 2022). In order to meet the increasing need for ICU nurses during the COVID-19 pandemic, nurses working in other clinics, with or without previous ICU experience or training, were assigned to work in ICUs (Kıraner and Terzi, 2020). Some of the nurses assigned to the ICUs were assigned to the care of patients diagnosed with COVID-19 without providing appropriate training; they took direct patient care responsibility without a guide/experienced ICU nurse in some shifts, where there were not enough experienced nurses. In addition, they had difficulty breathing for long hours, felt thirsty, had difficulty speaking and communicating due to the personal protective equipment (PPE) they used to prevent the risk of infection during patient care, and they even had trouble accessing PPE in some institutions or some units. Especially in the first days of the pandemic, they had to work a busy schedule and for long hours without taking a break (Kıraner, Terzi B, Türkmen, Kebapçı and Bozkurt 2020; Kıraner and Terzi, 2020; Şentürk and Yıldırım Keskin, 2021).

The limited number of studies on the effect of the pandemic on the workload and quality of work-life in Turkey, for ICU nurses, in particular, creates a deficiency in identifying the problems faced by ICU nurses and planning and implementing solutions for these problems. Therefore, this study aimed to examine the quality of work-life, workload, and burnout in ICU nurses during the COVID-19 pandemic. Unlike other studies, our study includes a comparison between pre-pandemic and pandemic periods in order to better understand the quality of work life, workload and burnout of ICU nurses during the pandemic period.

METHODS

Design

This cross-sectional and descriptive study was conducted to determine the quality of work-life, workload, and burnout in ICU nurses during the pandemic. The study was conducted according to Strengthening the Reporting of Observational studies in Epidemiology (STROBE) Guidelines.

Sample and Setting

Due to the circumstances surrounding the pandemic, the study sample was selected by the snowball sampling method. The ICU nurses who met the inclusion criteria and volunteered to participate in the study were reached between February 2022 and April 2022 through the Turkish Intensive Care Nurses Association. ICU nurses were invited to participate in the study via the association's social media account. Participating nurses were asked to share the participation link with other ICU nurses in their area to increase participation. Nurses who (1) had at least one year of experience in an ICU before the pandemic and (2) worked in the ICU for at least one month during the pandemic were included.

Data Collection

Because the COVID-19 pandemic prevented data collection through face-to-face interviews, the Google Forms platform was used for data collection. The link to the Google Form was shared in the e-mail group and the social media account of the above-mentioned association. The data were collected with the Nurse Information Form, Quality of Nursing Work Life Scale, Individual Workload Perception Scale-Revised, and Burnout Measure-Short version. For a better understanding of the impact of the pandemic, nurses were asked to evaluate the questions on these scales twice, taking into account the working conditions/environment in the (1) pre-pandemic and (2) pandemic periods.

Data Collection Tools

Nurse information form: This form developed by the researchers included questions on socio-demographic and professional characteristics of nurses (such as age, gender, education, ICU setting, work experience, weekly working hours, nurse: patient ratio).

Quality of Nursing Work Life Scale (QNWLS): The QNWLS was developed by Brooks (2001) to determine the quality of work-life of nurses; the validity and reliability study of the Turkish version was performed by Şirin and Sökmen (2015). As a result of the item-total score correlation analysis, seven items were removed. The QNWLS has 35 item and five sub-dimensions: (1) work environment, (2) relations with managers, (3) work conditions, (4) job perception, and (5) support services. The Turkish version of QNWLS is rated on a 5-point Likert type (1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree). Items 3, 11, 16, and 20, which include negative statements, are scored in reverse. The total score ranges from 35 to 175 where higher scores indicate higher quality of work life (Şirin and Sökmen, 2015). While the Cronbach's alpha coefficient was found to be 0.89 in the study for the Turkish version of the scale (Şirin and Sökmen, 2015), it was found to be 0.87 in this study.

Individual Workload Perception Scale-Revised (IWPS-R): This scale was developed to measure nurses' perceptions of their working environment. The first version of the IWPS-R consisted of 46 items but was later revised to 29 items (Cox et al., 2006). The IWPS-R consists of five sub-dimensions (manager support, peer support, unit support, workload, and intent to stay) where items are rated on a five-point Likert type (from 1=strongly disagree to 5=strongly agree). Four items (11, 13, 22, and 23) are scored inversely. The total score ranges from 29 to 145 where higher scores indicate that the perceived workload of the individual is low. The Turkish version of the IWPS-R was prepared by Özyürek and Kılıç (2022); cronbach's alpha value was found to be 0.92 and between 0.72 and 0.93 for its subscales. In this study, Cronbach's alpha coefficient of the scale was found to be 0.90.

Burnout Measure-Short version (BMS): The BMS is a 10-item tool that evaluates an individual's level of physical exhaustion, emotional exhaustion, and mental exhaustion based on the main components of the concept of burnout (Malach-Pines, 2005). In the BMS, the participants are asked to report to what extent their jobs make them feel tired, disappointed, hopeless, trapped, helpless, depressed, physically exhausted/sickly, and worthless/sense of failure, cause difficulties in sleeping, and make them feel no longer willing to do the job. Each item is evaluated in a 7-point Likert type (from 1=never to 7=always), and the total score ranges from 10 to 70. A score of 40 or above indicates burnout. The validity reliability of the Turkish version of BMS was performed by Çapri (2013), and Cronbach's alpha was found to be 0.91. In our study, Cronbach's alpha coefficient was found to be 0.94.

Analysis

Data analyses were performed using the SPSS version 20 (IBM, Statistical Package for Social Sciences). Descriptive statistics were used to analyze the socio-demographic, occupational, and ICU characteristics. Continuous measures were summarized as a mean and standard deviation; categorical variables were analyzed using frequency and percentage. The Shapiro-Wilk test was used to confirm normal distribution. The Spearman's test was used to analyze correlations between the quality of work-life, workload, and burnout. Wilcoxon test was used to compare scores before and during the pandemic, and the Kruskal-Wallis H test and Mann-Whitney U test were used for other comparisons. The significance level of p-value was considered as < 0.05.

Ethical Considerations

Approval for the study was obtained from the Clinical Research Ethics Committee at Bursa Uludağ University School of Medicine (Decision number: 2022-2/8 on 19 January 2022) and the Ministry of Health COVID-19 Scientific Research Evaluation Commission. An "Informed Voluntary Consent Form" was presented to the participants via Google Form. Accordingly, the data were collected after responding "Yes" to the statement "I participate in this study completely voluntarily". Participants filled out the survey form linked directly to the Google platform anonymously.

RESULTS

Socio-Demographic, Occupation, and Characteristics of the Intensive Care Unit Worked

The socio-demographic, occupational, and ICU characteristics of the nurses are shown in Table 1. The mean age of the nurses included in the study (n = 249) was 34.24±5.05 years, most of them were female (76.3%) and had a bachelor's degree (69.5%). Almost half (48.6%) of the participants reported working in a public/city hospital in anesthesiology (28.5%) and internal medicine ICUs (22.1%) before the pandemic. The mean work experience as a nurse was 8.94±4.95 years, and the average work experience in the pandemic ICU was 8.75±5.52 months. Nurses worked an average of 48.52±6.82 hours per week in the ICU in the pre-pandemic period and

55.34±10.14 hours per week in the ICU in the pandemic period. While the nurse: patient ratio was mostly 1:2 in their pre-pandemic ICUs (54.2%), it was reported to be mostly 1:3 patients in pandemic ICUs (68.7%).

Table 1. Socio-Demographical, Occupational, and ICU Characteristics of Nurses (n = 249)

Characteristics	n (%) or M ± SD (min-max)
Age *(years)*	34.24±5.05 (23-47)
Age *(categorical)*	
23-28 years	66 (26.5)
29-34 years	101 (40.6)
35-40 years	65 (26.1)
> 40 years	17 (6.8)
Gender	
Female	190 (76.3)
Male	59 (23.7)
Education	
Associate degree	20 (8.0)
Bachelor's degree	173 (69.5)
Postgraduate degree	56 (22.5)
Type of hospital	
Private hospital	26 (10.4)
State/City hospital	121 (48.6)
University hospital	102 (41.0)
ICU setting working before the pandemic	
Anesthesiology	71 (28.5)
General surgery	36 (14.5)
Internal medicine	55 (22.1)
Mixed	37 (14.9)
Cardiovascular/Cardiology	22 (8.8)
Pediatrics	28 (11.2)
Work experience *(years)*	8.94±4.95 (1-27)
Work experience *(categorical)*	
1-3 years	36 (14.5)
4-6 years	59 (23.7)
7-9 years	42 (16.8)
10-12 years	57 (22.9)
> 12 years	55 (22.1)
Work experience in pandemic ICU *(months)*	8.75±5.52 (1-24)
Work experience in pandemic ICU *(months) (categorical)*	
1-6 months	106 (42.6)
7-12 months	100 (40.2)
13-18 months	19 (7.6)
> 18 months	24 (9.6)
Weekly working hours in the ICU worked before the pandemic	48.52±6.82 (40-72)
Weekly working hours in the ICU worked before the pandemic *(categorical)*	
≤ 48 hours	198 (79.5)
> 48 hours	51 (20.5)
Weekly working hours in pandemic ICU	55.34±10.14 (40-96)
Weekly working hours in pandemic ICU *(categorical)*	
≤ 48 hours	123 (49.4)
> 48 hours	126 (50.6)
Nurse: patient ratio in the ICU worked before the pandemic	
1:1	22 (8.8)
1:2	135 (54.2)
1:3	77 (30.9)
≥ 1:4	15 (6.1)
Nurse: patient ratio in the pandemic ICU	
1:1	0 (0)
1:2	37 (14.8)
1:3	171 (68.7)
≥ 1:4	41 (16.5)

M: mean, SD: standard deviation, ICU: Intensive care unit.

Quality of Work-Life, Workload, and Burnout Before and During the Pandemic

The quality of work-life, workload, and burnout levels of nurses before and during the pandemic are summarized with total and subscale scores in Table 2. The mean QNWLS (quality of work-life) score of the nurses was 128.12±10.86 points before the pandemic and 71.46±7.37 points during the pandemic, with a significant difference between the total and subscale scores (p=0.001 for all). The mean IWPS-R (workload) score of the nurses was 101.93±8.98 points in the pre-pandemic period and 61.09±7.41 points during the pandemic. The differences between the total IWPS-R score and subscale scores before and during the pandemic were statistically significant (p=0.001 for all). The mean BMS (burnout) score of the nurses was 20.93±2.03 and 56.02±2.46 points before and during the pandemic, respectively. Significant differences were found between the total BMS score and subscale scores before and during the pandemic (p=0.001 for all).

Table 2. Nurses' Quality of Work-Life, Workload, and Burnout Levels Before and During the Pandemic

Scale/Inventory	Number of items	Score (min-max)	Before the pandemic (M±SD)	During the pandemic (M±SD)	p value[a]
QNWLS					
Work environment	9	9-45	31.95±4.07	15.07±3.15	0.001*
Relations with managers	5	5-25	21.14±3.21	13.39±2.84	0.001*
Work conditions	10	10-50	35.42±3.82	13.48±2.29	0.001*
Job perception	7	7-35	24.10±3.02	22.30±2.95	0.001*
Support services	4	4-20	15.48±2.38	7.19±1.55	0.001*
Total	35	35-175	128.12±10.86	71.46±7.37	0.001*
IWPS-R					
Manager support	8	8-40	25.39±3.50	16.27±1.95	0.001*
Peer support	6	6-30	21.32±4.63	18.01±4.11	0.001*
Unit support	6	6-30	21.78±3.23	12.85±2.75	0.001*
Workload	4	4-20	15.73±1.46	7.29±1.11	0.001*
Intent to stay	5	5-25	17.73±2.53	6.65±1.75	0.001*
Total	29	29-145	101.93±8.98	61.09±7.41	0.001*
BMS					
Tired	1	1-7	2.99±0.72	5.96±0.68	0.001*
Disappointed	1	1-7	2.08±0.61	5.21±0.70	0.001*
Hopeless	1	1-7	1.97±0.68	5.44±0.76	0.001*
Trapped	1	1-7	1.81±0.62	5.98±0.71	0.001*
Helpless	1	1-7	1.62±0.58	5.32±0.80	0.001*
Depressed	1	1-7	2.04±0.77	5.06±0.74	0.001*
Physically exhausted	1	1-7	2.39±0.78	5.82±0.76	0.001*
Worthless	1	1-7	1.83±0.61	6.06±0.65	0.001*
Difficulties in sleeping	1	1-7	2.17±0.75	5.38±0.70	0.001*
Willing to do the job	1	1-7	1.99±0.70	5.74±0.75	0.001*
Total	10	10-70	20.93±2.03	56.02±2.46	0.001*

M: mean, SD: standard deviation; QNWLS: Quality of Nursing Work Life Scale; IWPS-R: Individual Workload Perception Scale-Revised; BMS: Burnout Measure-Short version; a: Wilcoxon test; *: p<0.05

During the pandemic, a significant positive correlation was found between the quality of work-life and workload of nurses (p=0.001) but not burnout level (p=0.721). A significant negative correlation was found between nurses' workload and burnout level (p=0.005) (Table 3).

Table 3. Correlations between Quality of Work Life, Workload and Burnout During the Pandemic

	Spearman correlation	Quality of work life	Workload	Burnout
Quality of work life	r		0.252	0.023
	p		0.001*	0.721
Workload	r	0.252		-0.179
	p	0.001*		0.005*
Burnout	r	0.023	-0.179	
	p	0.721	0.005*	

*: p<0.05

In addition, the relationship of nurses' quality of work-life, workload, and total burnout scores to their socio-demographic and ICU characteristics were examined (Table 4). There was no significant difference between the scores of different groups defined by age, gender, or education ($p>0.05$). While there was no relationship between the type of hospital in which the nurses worked and their quality of work-life and workload ($p>0.05$), a significant relationship was found with the burnout level ($p=0.036$). A significant correlation was found between nurses' workload and burnout level and their work hours in the pandemic ICU, weekly work hours, and the nurse: patient ratio ($p<0.05$).

Table 4. Comparison of the Quality of Work-Life, Workload, and Burnout Levels During the Pandemic Period for Nurses Grouped by Their Socio-Demographic or ICU Characteristics

Variables		Total score (M±SD)		
		QNWLS	IWPS-R	BMS
Age[a]	23-28 years	70.37±8.30	60.78±8.40	55.90±2.58
	29-34 years	71.01±5.65	61.42±7.11	56.01±2.39
	35-40 years	71.06±7.35	60.33±6.93	56.15±2.58
	> 40 years	70.88±8.74	60.41±7.22	56.05±2.04
	p-value	0.378	0.425	0.887
Gender[b]	Female	71.24±7.55	61.06±7.56	56.07±2.45
	Male	72.15±6.78	61.18±6.95	52.88±3.56
	p-value	0.251	0.630	0.641
Education[a]	Associate	70.25±5.64	61.05±7.45	56.70±2.55
	Bachelor's	71.83±7.17	61.02±7.79	55.99±2.45
	Postgraduate	71.53±7.58	61.33±6.23	55.89±2.12
	p-value	0.573	0.671	0.490
Type of hospital[a]	Private	70.61±4.91	59.88±5.82	58.03±2.14
	State/City	71.71±7.37	60.32±5.98	55.39±2.45
	University	71.56±7.80	62.32±9.02	54.58±2.53
	p-value	0.153	0.595	0.036*
Work experience in pandemic ICU[a]	1-6 months	72.54±6.91	61.11±8.02	52.84±2.64
	7-12 months	71.03±7.34	60.73±6.82	55.08±2.07
	13-18 months	69.73±5.92	59.10±6.11	57.26±2.62
	> 18 months	69.83±9.86	55.50±6.24	59.41±3.04
	p-value	0.190	0.022*	0.045*
Weekly working hours in pandemic ICU[b]	≤ 48 hours	71.50±7.70	62.44±8.40	52.12±2.58
	> 48 hours	71.42±7.06	59.77±6.05	59.93±2.34
	p-value	0.951	0.043*	0.021*
Nurse: patient ratio in the pandemic ICU[a]	1:2	71.27±8.15	62.54±7.93	53.35±2.39
	1:3	71.90±7.05	60.32±5.33	55.84±2.44
	≥ 1:4	69.78±7.87	58.82±5.17	59.48±2.58
	p-value	0.322	0.027*	0.015*

a: Kruskal-Wallis Test; b: Mann Whitney U test; M: mean, SD: standard deviation; ICU; Intensive care unit; QNWLS: Quality of Nursing Work Life Scale; IWPS-R: Individual Workload Perception Scale-Revised; BMS: Burnout Measure-Short version; *: p<0.05

DISCUSSION

To the best of our knowledge, this is the first study in our country to assess the quality of work-life, workload, and burnout status of ICU nurses before and during the COVID-19 pandemic. The study demonstrated that, compared to the pre-pandemic period, the quality of work-life, workload, and burnout levels of nurses were affected negatively during the pandemic period.

As an unexpected public health crisis, the COVID-19 pandemic caused a rapid shift in ICU activities, with the drastic new measures for patient care. The most important determinants of this change were that COVID-19 had high disease severity and mortality and patients needed mechanical ventilation more frequently (Hoogendoorn et al., 2021). All ICUs around the world have faced demands for extra ICU beds, nurses, and more healthcare professionals for COVID-19 patients (Kerlin et al., 2021). This demand was attempted to be met by recruiting the support of other nurses who had no previous ICU experience and accelerating the appointment of new nursing graduates to hospitals (Marks, Edwards and Jerge, 2021). The COVID-19 pandemic brought

several changes such as the prolonged work hours, lack of medical supplies, and necessity of PPE use in many areas of patient care, including ICUs (Llop-Gironés et al., 2021). As a result of these changes, the nursing workload and nurses' quality of work-life in the ICUs were significantly affected.

In our study, it was observed that the ICU nurses' quality of work-life (measured with the QNWLS) decreased during the pandemic period, with particular decreases in the average scores for the subscales of work environment, work conditions, and support services. There was also a significant positive correlation between the total quality of work-life score and the total perceived workload score in our study. Given that a high QNWLS total score indicates a high quality of work-life and a high IWPS-R score indicates a low workload, it has been shown that the workload conditions during the pandemic instigated serious change in the quality of work-life of nurses.

We found an overall increase in the workload based on the IWPS-R. Three studies conducted in Italy, Belgium, and the Netherlands measured the workload with the Nursing Activities Score (NAS) to investigate the effect of the COVID-19 pandemic on nursing workload. Compared with those caring for patients without COVID-19, the nurses caring for COVID-19 patients had significant increases of 21, 20, and 12 points in their NAS scores (Bruyneel et al., 2021; Hoogendoorn et al., 2021; Lucchini et al., 2020). We used IWPS-R to measure workload in our study and found that among the sub-dimensions of workload, the 'intent to stay' was particularly more affected. The fact that the COVID-19 pandemic increased the workload and burnout in nurses in our study and led to low quality of work-life may have affected their intention to leave. Heinen et al. (2013) indicated that the characteristics of the work environment, professional identity, job satisfaction, and burnout due to excessive workload are the most persuasive factors affecting nurses' decision to quit or leave their job.

It was observed that the level of burnout, which was evaluated with the BMS, increased in general and in all sub-dimensions during the pandemic. Some studies have reported further increases in the prevalence of burnout among healthcare workers in several countries during the epidemic (Kunno, Supawattanabodee, Sumanasrethakul, Wiriyasirivaj and Yubonpunt, 2022; Nishimura et al., 2021). A recent systematic review and meta-analysis examining psychological symptoms among frontline healthcare workers during the pandemic reported the prevalence of burnout to be 31.8% (Busch, Moretti, Mazzi, Wu and Rimondini, 2021). Moreover, in a cohort study, Kok et al. (2021) reported that the symptoms of burnout experienced by healthcare workers working in ICUs worsened during the COVID-19 pandemic compared to the pre-pandemic periods. It is expected that the burnout levels of healthcare workers will increase due to the significant changes triggered by the pandemic. In our study, especially during the pandemic period, the relationship between decreased IWPS-R scores of ICU nurses (i.e., high workload) and increased burnout levels supports this situation.

In our study, nurses reported an increase in weekly work hours and the nurse: patient ratio in the pandemic ICU conditions compared to pre-pandemic ICU conditions. In addition, it was observed that the workload and burnout scores of nurses increased significantly with increases in work time in the pandemic ICU, weekly working hours, and the nurse: patient ratio. Optimal management of work hours and the nurse: patient ratio is essential to ensure the quality and safety of patient care. Studies have reported an association between the inadequate nurse: patient ratio and increased hospital mortality (Aiken et al., 2014; Margadant et al., 2020; Needleman et al., 2020), and in particular, increased adverse events and nosocomial infections (Cimiotti, Aiken, Sloane and Wu, 2012; Daud-Gallotti et al., 2012; Jansson, Syrjälä and Ala-Kokko, 2019). Several studies have shown that long work hours reduced nurses' ability to detect adverse changes in their patients or to address these changes promptly (Trinkoff et al., 2011), led to reduced patient safety, poor quality of care, increased number of care activities to be missed (Griffiths et al., 2014), and produced negative nursing outcomes such as complaints from patients or families (Son, Lee and Ko, 2019).

Limitations

This study has several limitations. Firstly, due to the cross-sectional design, a causal relationship could not be established between the variables. Therefore, longitudinal and prospective studies are needed. Secondly, voluntary participation via an online form could have created a biased response due to the self-selection of the sample. Thirdly, due to the data collection method of the study, in-depth data could not be collected about the facilities where participating nurses worked (i.e., number of hospitals included, sizes of ICUs, and bed capacity).

CONCLUSION

This study demonstrated that Turkish ICU nurses' quality of work-life generally decreased during the pandemic period while their workload and burnout levels increased. Working in pandemic ICUs for extended periods, increased weekly work hours, and decreased nurse: patient ratio have led to a further increase in workload and burnout. These findings highlight the importance of adopting policy and practice changes that take into account and promote employee well-being, in adapting to the ongoing pandemic and preparing for future crises. The COVID-19 pandemic still continues, so the workload and burnout of the nurses fighting on the

frontlines in such difficult conditions will keep increasing. Along with government policies, hospital administrations should ensure a continuous standard of care in the institution by adopting practices that support employee welfare and motivation.

Author Contributions

Concept and design: Ö.E.D., Y.Y. Data collection: Ö.E.D. Data analysis and interpretation: Ö.E.D., Y.Y. Writing manuscript: Ö.E.D., Y.Y. Critical review: Ö.E.D., Y.Y.

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