Original Article

Sleep quality of hospital nurses during COVID-19 pandemic

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Abstract

Context: In pandemic process, nurses, who are the primary day-to-day caretakers of COVID-19 patients, encounter physical, psychological, and social problems due to the long working hours, the possibility of being exposed to the virus. These negative factors adversely affect the sleep quality of nurses.

Aims: We aimed to investigate sleep quality in nurses working at a hospital during the COVID-19 pandemic.

Setting and Design: This cross-sectional descriptive study was carried out between August and September 2020.

Materials and Methods: Study data were collected from 234 nurses working in a hospital in Turkey using demographic and professional characteristics form and the Pittsburgh Sleep Quality Index (PSQI).

Statistical Analysis: The data of the study were evaluated using the statistical software program SPSS 20.

Results: The nurses' mean total PSQI score was found to be 10.76 ± 3.23. There was no statistically significant difference between the variables of age, gender, education and having children and the mean total PUKI score ($P > 0.05$).

Conclusion: In this study, it was determined that most of the nurses had sleep problems, and that their sleep quality was poor. It can be recommended to conduct more studies that draw attention to the sleep quality of nurses during the pandemic, and to evaluate the results and to share them with nurses and hospital administrators. Furthermore, it may be recommended to provide counseling to nurses on complementary practices (listening to music, massage, meditation, etc.) that will increase the motivation of nurses and provide mental relaxation.

Keywords: COVID-19, Nurse, Pandemic, Sleep quality

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Received: 02 March 2021; **Revised:** 03 August 2022; **Accepted:** 15 August 2022; **Published:** 14 December 2022

INTRODUCTION

As in most pandemics, nurses are at the forefront in the fight against COVID-19, which has now spread to 216 countries. The number of people infected with the virus was increasing day by day, and hospitals were increasing full capacities since the pandemic emerged. In this process, nurses, who are the primary day-to-day caretakers of COVID-19 patients, encounter physical, psychological, and social problems due to the long and intense working hours, the possibility of

Access this article online	
Quick Response Code:	Website: www.jnmsjournal.org
	DOI: 10.4103/jnms.jnms_32_21

How to cite this article: Sungur M, Ovayolu N, Ovayolu O, Disli E. Sleep quality of hospital nurses during COVID-19 pandemic. J Nurs Midwifery Sci 2022;9:317-23.

being exposed to the virus, and concern over transmitting the virus to others.[1] Under these conditions, the sleep quality of nurses has been shown to be adversely affected, the results of which can lead to undesirable consequences in providing quality care to patients and preventing infection.[2,3] In addition, along with the increased workload and responsibility, anxiety and tension are also responsible for diminishing the sleep quality of nurses.[4,5] The relevant literature reports that health-care professionals, especially nurses, experience fear and anxiety during the treatment and care of patients infected with this virus[6] and are vulnerable to experiencing major stress and tension on account of intense workload and the role of providing moral support to patients and their relatives. Moreover, the lack of medical equipment, long working hours due to lack of sufficient health-care personnel, separation from family, and disruption to social life cause high levels of tension and fatigue in nurses.[3,7] All these negative stimuli adversely affect the sleep quality of nurses.[8] Disruption of sleep,[9] a factor that affects physical health, has a negative impact on job satisfaction and productivity of nurses.[4] Accordingly, this study aimed to evaluate sleep quality in nurses working during the COVID-19 pandemic.

MATERIALS AND METHODS

Research design and setting

This study applied a cross-sectional and descriptive research design and was conducted in a state hospital in Gaziantep, Turkey, between August and September of 2020. In the hospital where the study was conducted; one internal medicine clinic, two internal medicine intensive care units, one surgery clinic, two surgical intensive care units, one pediatric clinic, one neonatal intensive care unit, one obstetrics and gynecology clinic, one neurology clinic, one neurology intensive care unit, one urology clinic , a cardiology intensive care unit, an orthopedics clinic, an emergency room (burn, vomiting, fracture and trauma, etc.), two general intensive care units, diabetes education clinic and electrocardiography clinic provide health services to patients. The population of the study consisted of 350 nurses who were working in all units of a state hospital. From this universe, the sample included 234 nurses who agreed to participate in the study and completely filled out the data collection tools. The sample number comprised 66.85% of the nurses working in the hospital. The data collection tools were administered to the participating nurses online.

Inclusion criteria

Only individuals who were employed as nurses, agreed to participate in the study, had an internet connection, and were able to answer questions online were included in the study.

Exclusion criteria

Individuals who wanted to leave the study and did not know how to answer the questions online were excluded.

Data collection tools

Study data were collected using a questionnaire form and the Pittsburgh Sleep Quality Index (PSQI).

Demographic and professional characteristics form

This form, which was developed after reviewing previous studies[3,4,10] and obtaining expert opinions, includes questions about the sociodemographic characteristics of the nurses, COVID-19, and prevention methods.

Pittsburgh Sleep Quality Index

This scale was developed by Buysse *et al.* in 1989,[11] and the Turkish validity and reliability study was conducted by Ağargün *et al.*[12] The PSQI, which evaluates sleep quality over the course of the last month, contains 24 questions. Scores on the scale range from 0 to 21, and scores higher than 5 indicate poor sleep quality.

Implementation of data collection tools

Data collection tools were created in the google.docs application. This study was conducted using the cross-sectional descriptive research type. Data collection tools were shared by the researcher with the nurses online (applications such as WhatsApp, Instagram, Twitter). After the nurses completed the data collection tools, they were asked to confirm the completion by sending the message "I sent it." After expressing that they had difficulties with the form, 10 of the participants were guided on how to fill out the form.

Ethical considerations

Before starting the study, approval (approval no:2020/08) from the Ethics Committee of the Faculty of Medicine of a university hospital, and institutional permission (05.08.2020/87825162-774.99) were obtained from the Ministry of Health and the Provincial Health Directorate of the institution where the study was conducted. The purpose of the study was explained to the nurses and verbal consent was obtained from the nurses before they could participate in the study. In addition, the nurses were told that their information would be kept confidential and that they could leave from the study whenever they wanted.

Data analysis

The data of the study were evaluated using the statistical software program SPSS 20 (Statistical Package for Social Sciences, SPSS Inc., Chicago, IL, USA) statistical software was used to analyze the data. The data were analyzed using descriptive statistics, Student's *t*-test, Mann–Whitney U test,

and Kruskal–Wallis test. A value of $P < 0.05$ was accepted as the significance level.

RESULTS

Of the participating nurses, 50% were between the ages of 26–33, 81.2% were female, 58.5% had an income equal to their expenses, 75.6% were undergraduates, and 62.4% did not have children. The nurses' mean total PSQI score was found to be 10.76 ± 3.23. There was no statistically significant difference between the variables of age, gender, education and having children and the mean total PUKI score ($P > 0.05$); however, there was a significant difference between the nurses' economic status and their mean total PSQI score ($P < 0.05$). In addition, the mean total PSQI score of those whose income was equal to expenses was significantly higher [Table 1].

Among the nurses, 41.5% had chosen the nursing profession "partially willingly," 43.2% had been working for 1–5 years, 43.6% worked in the intensive care unit, and 92.7% worked as clinician nurses. It was further determined that 70.9% of the nurses worked 41 h or more per week, 67.1% worked in shifts, and only 29.5% were satisfied with their work schedule at the hospital. No statistically significant difference was found between the variables of selecting the profession willingly, weekly working hours, current working unit, hospital working shifts and the mean total PSQI score ($P > 0.05$); however, there was a significant difference between the variables of nurses' position at work, job satisfaction, satisfaction with working shifts, and mean total PUKI score ($P < 0.05$). Furthermore, it was found that those who were not satisfied with their job and the working schedule had poorer sleep quality [Table 1].

It was determined that 53.4% of the nurses worked in direct contact with COVID-19 patients, 97.9% had knowledge about modes of transmission and symptoms of COVID-19, and 98.7% knew the precautions that should be taken to avoid contraction of COVID-19. The study found that almost all the nurses took precautions to protect against COVID-19, were afraid of transmitting COVID-19 to their families or friends, and knew about the method of diagnosis. In addition, 81.6% of the nurses paid special attention to their nutrition to protect themselves against COVID-19, 55.1% followed the WHO website, and 85.5% followed the information about COVID-19 posted on the website of the Ministry of Health. No statistical difference was found between being in direct contact with COVID-19 patients, knowing the modes of transmission and symptoms of COVID-19, being in direct contact with COVID-19 patients, knowing the ways of transmission and symptoms of COVID-19, the measures to be taken to protect from COVID-19, taking precautions, fear of infecting family or friends with COVID-19, information about the diagnosis method that there is no statistically significant difference between the variables of having a family, taking care of nutrition to protect from COVID-19, and following information about COVID-19 on the page of WHO and the Ministry of Health, and the total score averages of PUKI ($P > 0.05$) was detected. The study found that those who had knowledge about the diagnosis method of COVID-19, who were in direct contact with COVID-19 patients, and who did not take care of their nutrition to protect themselves against COVID-19 had poorer sleep quality [Table 2].

Due to the COVID-19 epidemic, 88% of nurses' quality of life was affected, 63.7% were worried about the future, 77.4% were negatively motivated, 50% had sleep problems, 77.4% were working during working hours. It was determined that there was a change in sleep and 51.7% of them experienced sleep problems due to this. It was further observed that 67.5% of the nurses experienced fatigue due to issues related to COVID-19, 79.1% had health-care professionals infected with COVID-19 in the institution where they worked, and 53.4% of them had infected their family with this virus. There was a statistically significant correlation between the variables of quality of life and motivation being negatively affected due to the epidemic, experiencing sleep problems and fatigue, sleep problems caused by changes in working hours, the presence of health-care professionals infected with COVID-19 in the institution and the presence of health-care professionals who infected their family with the virus, and the mean total PSQI score ($P < 0.05$). Those who experienced sleep problems and fatigue due to COVID-19, those whose motivation was negatively affected, and those who were worried about their future had poorer sleep quality [Table 3].

DISCUSSION

This study, conducted to evaluate sleep quality in nurses working during the COVID-19 pandemic found that the nurses had a significantly high mean total PSQI score (10.76 ± 3.23), which indicated that their sleep quality was poor. A 2019 study examining the sleep quality of health-care workers who were screened for COVID-19 infection reported that the mean total PSQI scores before and after the screening were 6.54 ± 0.196 and 8.24 ± 0.326, respectively, suggesting that the sleep quality of the nurses gradually deteriorated.[13] A similar study conducted with health-care professionals found that the mean PSQI total score was 7.22 ± 2.62, which, again, is an indication of poor sleep quality.[14] In another study, the mean total PSQI score of

Table 1: Results related to the relationship between nurses' sociodemographic-professional characteristics and mean Pittsburgh Sleep Quality Index scores

Characteristics	*n* (%)	χ^2/P	PSQI ($\bar{X}$±SS)	*P*
Age				
18-25	55 (23.5)	51.920/0.140	10.92±2.89	0.383*
26-33	117 (50.0)		10.85±3.34	
34-41	48 (20.5)		10.13±3.26	
42 and above	14 (6.0)		11.53±3.61	
Gender				
Female	190 (81.2)	11.459/0.650	10.82±3.25	0.514**
Male	44 (18.8)		10.46±3.17	
Educational status				
High school (with nursing education background)	15 (6.4)	2.88±0.651	11.53±3.77	0.310*
Associate degree	20 (8.5)		11.36±2.75	
Undergraduate	177 (75.6)		10.53±3.21	
Postgraduate	22 (9.4)		11.47±3.38	
Economic status				
Income less than expenses	54 (23.1)	51.281/0.005	12.48±3.20	0.000***
Income equal to expenses	137 (58.5)		10.54±3.06	
Expenses higher than income	43 (18.4)			
Have any children				
Yes	88 (37.6)	11.910/0.614	10.78±3.11	0.941**
No	146 (62.4)		10.75±3.32	
Chose the profession willingly				
Yes	94 (40.2)	36.642/0.127	10.58±3.22	0.263***
No	43 (18.4)		11.50±3.34	
Partially	97 (41.5)		10.59±3.19	
Work experience (years)				
1-5	101 (43.2)	20.600/0.842	10.49±3.01	0.415***
6-10	70 (29.9)		11.17±3.23	
11 and above	63 (26.9)		10.72±3.58	
Satisfaction with working in the profession				
Satisfied	38 (16.2)	25.482/0.601	10.05±3.20	0.016***
Partially satisfied	149 (63.7)		10.57±3.15	
Not satisfied	47 (20.1)		11.95±3.29	
Current working unit				
Intensive care	102 (43.6)	60.137/0.034	10.40±3.26	0.281*
Operating room	4 (1.7)		10.75±3.86	
Emergency unit	30 (12.8)		11.73±3.18	
Inpatient units	98 (41.9)		10.80±3.19	
Position at work				
Supervisor nurse	17 (7.3)	16.436/0.288	12.35±3.35	0.039****
Clinician nurse	217 (92.7)		10.63±3.20	
Weekly working hours				
40 and below	68 (29.1)	19.475/0.148	10.85±3.21	0.790**
41 and above	166 (70.9)		10.72±3.25	
Work shifts				
Daytime shift	42 (17.9)	39.987/0.066	11.09±3.72	0.456***
Nighttime shift	35 (15.0)		10.17±3.15	
Rotating shifts	157 (67.1)		10.80±3.11	
Satisfaction with working shifts				
Yes	69 (29.5)	43.881/0.029	10.10±3.23	0.000***
No	79 (33.8)		11.98±3.16	
Partially	86 (36.8)		10.21±3.03	
Total	234 (100.0)		10.76±3.23	

*Kruskal-Wallis, **Independent Student's *t*, ***ANOVA, ****Mann-Whitney *U*. PSQI: Pittsburgh Sleep Quality Index

health-care professionals was found to be significantly high.[15] A study reported that 36.1% of health-care professionals experienced insomnia, and that the mean total ISI score was 8 and above.[16] Another similar study found that most of the participants had poor sleep quality.[17] Consistent with the literature, the current study also found that the mean total PSQI score of nurses during the pandemic period increased significantly, and that their sleep quality was negatively affected as a result of the COVID-19 pandemic.

Working in shifts affects many areas of life, including the social life of a person, by disrupting the sleep-wakefulness state and circadian rhythm. Studies have shown that compared to full-time day-shift workers, night-shift workers have poorer sleep quality and slower response time, and that the sleep problems resulting from shift work decrease work efficiency and cause an increased number of work accidents.[18,19] A study found that nurses working night shifts had more sleep problems compared to that of other

Table 2: Relationship between the attitudes and behaviors of nurses during the COVID-19 period and Pittsburgh Sleep Quality Index scores

Characteristics	*n* (%)	χ^2/*P*	PSQI ($\bar{X}$±SS)	*P*
In direct contact with COVID-19 patients				
Yes	125 (53.4)	20.967/0.102	11.00±3.36	0.246**
No	109 (46.6)		10.49±3.091	
Knowledge about modes of transmission and symptoms of COVID-19				
Yes	229 (97.9)	8.683/0.851	10.79±3.25	0.331****
No	5 (2.1)		9.40±2.60	
Know the precautions that should be taken to avoid getting COVID-19				
Yes	231 (98.7)	9.002/0.831	10.78±3.24	0.464****
No	3 (1.3)		9.33±3.51	
Take measures to avoid getting COVID-19				
Yes	233 (99.6)	8.329/0.871	10.76±3.24	0.919****
No	1 (0.4)			
Afraid of infecting family or friend with COVID-19				
Yes	229 (97.9)	54.871/0.000	10.71±3.16	0.230****
No	5 (2.1)		12.80±5.76	
Knowledge about the diagnosis method of COVID-19				
Yes	223 (95.3)	13.460/0.491	10.77±3.27	0.791****
No	11 (4.7)		10.40±2.45	
Pay attention to nutrition to avoid getting COVID-19				
Yes	191 (81.6)	23.735/0.049	10.60±3.16	0.111**
No	43 (18.4)		11.51±3.53	
Follow information about COVID-19 from the website of WHO				
Yes	129 (55.1)	18.655/0.179	10.81±3.41	0.788**
No	105 (44.9)		10.69±3.04	
Follow information about COVID-19 from the website of the Ministry of Health				
Yes	200 (85.5)	16.996/0.256	10.73±3.16	0.735**
No	34 (14.5)		10.93±3.68	
Total	234 (100)		10.76±3.23	

**Independent Student's *t*, ****Mann-Whitney *U*. PSQI: Pittsburgh Sleep Quality Index

nurses.[17] A similar study conducted with nurses reported that there was a significant relationship between night shift frequency per month and years of service work experience and sleep disorders in nurses.[20] Factors such as the wide range of responsibilities associated with the nursing profession, long working hours, and working different shifts are associated with higher frequencies of sleep problems.[17] The current study also found that the mean total PSQI scores of the nurses who were not satisfied with the working schedule of the hospital and those who worked for 41 hours or more were high. These factors can negatively affect nurses' work efficiency.

During the pandemic, the working conditions of nurses who strive to provide quality care to patients have changed. Many nurses have had to work in emergency and intensive care units where they had no experience.[21] The current study found that nurses working in the emergency units and those who were not satisfied with the working schedule of the hospital had poorer sleep quality, and that there was a significant difference between nurses' satisfaction with their positions at work, their profession and working schedule, and the mean total PSQI score.

During the pandemic period, nurses are faced with different difficulties such as new protocols, increasing number of patients and workload, unsuitable inadequate working conditions, resting environments, and increasing working hours. Although these difficulties, they risk their lives and perform their professions[22] and may be faced with a high risk of infection and even deadly dangers.[21,23] A study found that the sleep quality of health-care professionals who were in direct contact with COVID-19 cases was poor, a finding significantly correlated with the total PSQI score.[14] A similar study determined that health-care professionals working in specialized units for the treatment of COVID-19 patients had poor sleep quality compared to that of those working in general units; however, this finding had no significant relationship with the mean total PSQI score.[15] Another study reported that a majority of the health-care professionals experiencing insomnia were those that believed their profession required contact with infected patients, and all the health-care professionals reported having concerns about being infected.[16] The same study also found that there was a significant difference between thinking that being worried about themselves or the people they live with getting infected, taking precautions to avoid getting COVID-19, following information about the COVID-19 outbreak, and experiencing insomnia problems and not in terms of uncertainty about disease control.[16] The current study found that the sleep quality of those who

Table 3: Relationship between nurses' experiences in the COVID-19 period and Pittsburgh Sleep Quality Index Scores

Characteristics	*n* (%)	χ^2/P	PSQI ($\bar{X}$±SS)	*P*
Has COVID-19 pandemic affected quality of life?				
Yes	206 (88.0)	37.399/0.110	10.97±3.20	0.011*
No	2 (0.9)		12.50±6.36	
Partially	26 (11.1)		8.92±2.76	
Worry about the future due to the COVID-19 pandemic				
Yes	149 (63.7)	44.170/0.027	11.16±3.38	0.055*
No	23 (9.8)		9.90±2.48	
Partially	62 (26.5)		10.11±2.99	
Has work motivation been negatively affected by the COVID-19 pandemic?				
Yes	181 (77.4)	42.304/0.041	11.08±3.14	0.014*
No	10 (4.3)		9.22±4.17	
Partially	43 (18.4)		9.73±3.19	
Experience sleep problems due to COVID-19 pandemic				
Yes	117 (50.0)	81.043/0.000	11.82±3.16	0.000***
No	52 (22.2)		8.23±2.76	
Partial	65 (27.8)		10.98±2.60	
Have your working hours changed due to the COVID-19 pandemic?				
Yes	181 (77.4)	15.211/0.364	10.85±3.26	0.446**
No	53 (22.6)		10.46±3.17	
Have changes in working hours caused sleep problems?				
Yes	121 (51.7)	21.050/0.100	11.44±3.08	0.001**
No	113 (48.3)		10.07±3.26	
Experiencing fatigue due to the COVID-19 pandemic				
Yes	158 (67.5)	68.303/0.000	11.42±3.23	0.000*
No	21 (9.0)		8.65±2.99	
Partially	55 (23.5)		9.74±2.75	
Presence of COVID-19-infected health-care professionals at the institution				
Yes	185 (79.1)	20.029/0.129	11.09±3.32	0.003**
No	49 (20.9)		9.51±2.58	
Presence of health professionals at the institution who transmitted COVID-19 to their family				
Yes	125 (53.4)	16.733/0.271	11.18±3.29	0.039**
No	109 (46.6)		10.29±3.13	
Total	234 (100.0)		10.76±3.23	

*Kruskal-Wallis, **Independent Student's *t*, ***ANOVA, *U*. PSQI: Pittsburgh Sleep Quality Index

were in direct contact with COVID-19 patients, who had knowledge about modes of transmission and symptoms of COVID-19, and who knew about the precautions to be taken and took these precautions was poorer.

Despite all the difficulties, nurses selflessly provide health-care services to patients diagnosed with COVID-19 and to those with suspected illness. Nurses who are in close contact with these patients encounter many difficulties and risks, such as exposure to pathogens, long working hours, fatigue, occupational burnout, and physical and psychological violence.[24] In one study, nurses stated that their risk of being infected with COVID-19 was high, the majority of them did not feel safe at their workplace, and 41.1% felt that the caregiving they provided to COVID-19 patients produced a major emotional burden for them.[25] In a qualitative study, the workload and working hours of nurses have increased. It has been stated that when their physical and psychological needs cannot be met, they feel helpless.[26] Similarly, the current study found that most of the participating nurses experienced fatigue due to the COVID-19 epidemic, impairment to their quality of life, and concern about the future, and they further reported that their motivation had been negatively affected and their working hours changed, with 51.7% of them having sleep problems due to this change. In addition, there was a statistically significant relationship between the quality of life and motivation being adversely affected, experiencing sleep problems and fatigue due to the epidemic, experiencing sleep problems due to changes in working hours, worry over infecting the family with the virus, and the mean total PSQI score.

Limitations of the study

The results of this study are valid only for the nurses in the hospital where the study was conducted. In addition, these results show the sleep quality of nurses only during the pandemic process.

CONCLUSION

In this study, it was determined that most of the nurses had sleep problems, and that their sleep quality was poor. The physiological and psychological burden of the COVID-19 pandemic is closely related to the sleep quality of nurses. Nurses experience high levels of anxiety and fear during

this period. Increasing anxiety levels negatively affect the sleep quality of nurses and prevent them from providing quality nursing care. It can be suggested that the work schedules prepared for nurses should be arranged by the institution where they work, taking into account the required sleep time, and that training programs should be carried out that explain the importance of sleep in terms of mental and physical health, especially during the pandemic process.[27,28] It can be recommended to conduct more studies that draw attention to the sleep quality of nurses during the pandemic, and to evaluate the results and to share them with nurses and hospital administrators. Furthermore, it may be recommended to provide counseling to nurses on complementary practices (such as listening to music, massage, meditation, and yoga) that will increase the motivation of nurses and provide mental relaxation.

Conflicts of interest

There are no conflicts of interest.

Authors' contributions

Supervision – N.O. and Ö.O.; design – N.O., Ö.O., and M.S.; resources – N.O., Ö.O., M.S., and E.D.; material/s – N.O., Ö.O., M.S., and E.D.; data collection and/or processing – E.D. and M.S.; data analysis and interpretation – Ö.O. and M.S.; literature search – M.S. and Ö.O.; writing manuscript – Ö.O. and M.S.; and critical review – N.O. and Ö.O.

Financial support and sponsorship

Nil.

Acknowledgment

The authors are grateful to all the nurses who participated in this study.

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