ANXIETY, DEPRESSION, AND SLEEP DISTURBANCE IN HEALTH CARE WORKERS TAKING NASOPHARYNGEAL SWAB SAMPLES FOR COVID-19

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Abstract

Objectives: Health care workers (HCWs) fighting COVID-19 are at high risk of transmission. This risk and the increased workload place a heavy burden on HCWs. We aimed to determine anxiety, depression, and sleep disorders in HCWs who form mobile health units (MHUs) assigned to take samples for COVID-19 screening in Rize, Turkey.

Materials and Methods: A single-center, a web-based questionnaire was conducted between 20 July - 25 August 2020, in which MHUs on duty with a nasopharyngeal swab sampling were included. Demographic characteristics and information about the MHUs mission and related to the COVID-19 pandemic were collected, and anxiety, depression, and sleep quality were evaluated by Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI) and Pittsburgh Sleep Quality Index (PSQI). One hundred thirty participants were included in the study.

Results: HCWs' median BAI, BDI and PSQI scores were 6, 10 and 5.5, respectively. The frequencies of anxiety symptoms, depression symptoms and sleep disturbances were 45.38%, 53.08% and 50%, respectively. Both the severity and frequency of anxiety and sleep disorders increased as the number of people sampled by healthcare professionals increased and prolonged the working time in the MHUs. Those who suspect they have had COVID-19 at any time and were concerned about transmitting COVID-19 to their family or friends had higher anxiety and sleep quality scores.

Conclusion: In this study, high rates of anxiety, depression, and sleep disturbances were observed in HCWs. Special interventions to protect mental health will be beneficial for HCWs at risk of transmission.

Keywords: Anxiety, COVID-19, depression, mobile health units, sleep disturbance.

Introduction

As a result of COVID-19 disease, which emerged in December 2019 and was described as a pandemic in March 2020, over 433 million confirmed cases and over 5.9 million deaths have been reported globally as of 6 March 2022. In Turkey, from 3 January 2020 to 12 March 2022, there have been 96.094 deaths of COVID-19, reported to WHO.[1,2]

Given its high contagiousness, COVID-19 is characterized by a high risk of infection and even fatal risk among frontline health care workers (HCWs). These risks can create psychological stress for HCWs. There are studies showing a high rate of depression, anxiety and sleep disorders in HCWs in the COVID-19 pandemic.[3,4]

Over one hundred mobile health units (MHUs) have been formed by the Provincial Health Directorate to carry out effective filiation in Rize. During the pandemic process, these teams were assigned to take a nasopharyngeal swab sample (NSS) for COVID-19 screening by going to their homes or workplaces from the specified groups. Hairdressers, restaurant employees, football team managers and players and people who have come from other cities to Rize for tea farming or other reasons were some of the groups screened. HCWs in charge of taking NSS are one of the groups that make the closest contact with the sick person and have a very high risk of transmission if personal protective equipment is inadequate. In addition, this task is carried out at people's homes or workplaces and not in health institutions, which further increases the pressure on HCWs. The aim of this study was to determine anxiety, depression and sleep disorders in HCWs who form MHUs assigned to take samples for COVID-19 screening in Rize, Turkey.

Materials and Methods

Our study was a single-center, cross-sectional, web-based survey study conducted in Rize Province between 20 July–25 August 2020. The study included HCWs working in MHUs who were assigned to take NSS during the COVID-19 pandemic throughout the province. The questionnaire form comprised six parts: online informed consent, demographic characteristics, information about the MHUs mission and related to the COVID-19 pandemic, Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI) and Pittsburgh Sleep Quality Index (PSQI).

The HCWs who wanted to be included in the study were contacted by the researchers. After the people were informed about the study, a link to the web-based questionnaire was sent to the volunteer participants, and they were asked to complete this form completely. Those whose contact numbers could not be reached or who did not volunteer to participate in the study were not included in the study. The questionnaires recorded in the online system were followed up daily, incomplete or repeated questionnaires were checked, and quality control

was carried out. Two hundred and ten HCWs working in 105 MHUs were reached. One hundred and thirty of them volunteered to participate in the study and completed the questionnaire (response rate: 61.9%).

Demographic information like gender, age, marital status, occupation, years of working, and presence of organic and psychiatric illnesses were collected.

Later, information about the MHUs mission and related to the COVID-19 pandemic was questioned. In this section, first, it was determined what role they played in the MHUs (Nasopharyngeal sampling or helpful staff); how many people they took nasopharyngeal samples; how many hours they worked weekly on average, and how long days they had held this task. Afterward, information related to the COVID-19 pandemic was collected. The questions in this section were: "Do you think your protective equipment is sufficient during the sampling?", "Have you ever suspected you have COVID-19?", "Have you ever worried about transmitting COVID-19 to your family or friends?" and "Has any of your family or friends been diagnosed with COVID-19?"

Beck Anxiety Inventory (BAI) is a scale developed in 1988 to measure the severity of anxiety in a psychiatric population.[5] Its Turkish validity and reliability study was conducted by Ulusoy.[6] It comprises 21 items that question subjective anxiety and physical symptoms. Each symptom is graded as none, mild, moderate, and severe, scored between 0 and 3, respectively. Patients are asked to mark the most appropriate expression for each symptom, and the result is obtained by the sum of the items. The cut-off score was set at 16. Scores received by the practitioner; 8-15 = mild anxiety symptoms; 16-25 = moderate anxiety symptoms; 26-63 = severe anxiety symptoms.

Beck Depression Inventory (BDI) was developed in 1961 to measure the behavioral symptoms of depression in adolescents and adults.[7] Its Turkish validity and reliability study was conducted by Hisli.[8] Depression-specific behaviors and symptoms are described in a series of sentences, and each sentence is numbered 0-3. It comprises twenty-one items, and the items are listed according to the mild form to the severe form. Patients are asked to mark the statement that best describes their condition, and the result is obtained by the sum of the items. The cut-off score was set at 17. Scores received by the practitioner; 10-16 = mild depressive symptoms; 17-29 = moderate depressive symptoms; 30-63 = severe depressive symptoms.

Pittsburgh Sleep Quality Index (PSQI) is a scale that provides a quantitative measurement of sleep quality in order to define good and bad sleep in 1989.[9] Its Turkish validity and reliability study was conducted by Agargün.[10] It contains 24 questions. Nineteen of these are answered by the patients themselves. Five questions are answered by the patient's spouse or roommate and are used only for clinical information, and are not included in the scoring. Self-report questions include different factors related to sleep quality. The 18 items included in the scoring are grouped according to 7 component scores. These components are subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleeping medication, and

daytime dysfunction. Each question is evaluated with a number from 0 to 3. The sum of the scores of the seven components gives the total PSQI score. The total PSQI score takes a value between 0-21. If the total score is above 5, it is considered "poor" sleep quality.

The data were analyzed in a computer environment using the SPSS statistical package program. Descriptive statistics were made. The Chi-square test was used for the comparison of categorical variables. None of the numeric variables fit the normal distribution, and the Mann-Whitney U test was used for paired comparisons. The correlation of numeric variables was evaluated by Spearman analysis. Numerical data in the findings were given as median (minimum-maximum), and the frequency of categorical variables was given as the number of people (percentage rate). Statistical significance level accepted as $p < 0.05$.

Results

The characteristics of the participants are shown in Table 1. Ninety-seven (74.62%) of the HCWs were women, and the median age was 30 (21-52) years. While 69 (53.08%) of the HCWs suspected that they had had COVID-19 at any time, 114 (87.69%) were concerned about transmitting COVID-19 to their family or friends. The median BAI score was 6 (0-59). While 41 of the participants (31.54%) had anxiety (BAI≥16), 59 (45.38%) had the least mild anxiety symptoms (BAI≥8) (13.85%; mild anxiety symptoms, 16.15%; moderate anxiety symptoms, 15.38%; severe anxiety symptoms). Participants' median BDI score was 10 (0-46). Depression (BDI≥17) was detected in 38 (29.23%) of the HCWs, while 69 (53.08%) had at least mild depressive symptoms (BDI≥10) (23.85%; mild depressive symptoms, 25.38%; moderate depressive symptoms, 3.85%; severe depressive symptoms). HCWs' median PSQI score was 5.50 (0-18), and poor sleep quality (PSQI score of 6 and above) was found in 65 (50%) of them.

Anxiety frequency and anxiety scores were higher in participants who were female, married, nurses/technicians, had an organic disease, suspected they had had COVID-19 at any time, and whose family or friends had been diagnosed with COVID-19. Anxiety severity and frequency increased with increasing age, years of working, the number of people sampled, and the duration of working in the MHUs (Table 2).

The frequency and severity of depression were higher in women than in men. Depression scale scores were higher in those who suspected they had had COVID-19 at any time. As the duration of work in the MHUs increased, the severity and frequency of depression increased (Table 3).

Table 1. The characteristics of participants

Characteristics	n (%) or median (min-max)

Gender
  Male
  Female
	
	33 (25.38)
	97 (74.62)

Age	30 (21-52)

Marital status
  Married
  Single
	
	76 (58.46)
	54 (41.54)

Occupation
  Physician/Dentist
  Nurse/ technician
	
	29 (22.31)
	101 (77.69)

Year of working	7 (1-32)

Organic disease
  Yes
  No
	
	26 (20)
	104 (80)

Psychiatric illness
  Yes
  No
	
	12 (9.23)
	118 (90.77)

What role did you take on mobile health units?
  Nasopharyngeal sampling
  Helpful staff
	
	84 (64.62)
	46 (35.38)

How many people have you taken a nasopharyngeal swab sample? (n=84)	100 (10-650)
How many hours was the weekly working time?	48 (3-90)
How long did you have mobile health units in total? (day) (n=119)	21 (1-150)

Do you think your protective equipment is sufficient?
  Yes
  No
	
	120 (92.31)
	10 (7.69)

Have you suspected you had COVID-19 at any time?
  Yes
  No
	
	69 (53.08)
	61 (46.92)

Have you ever worried about transmitting COVID-19 to your family or friends?
  Yes
  No
	
	114 (87.69)
	16 (12.31)

Has any of your family or friends been diagnosed with COVID-19?
  Yes
  No
	
	30 (23.08)
	100 (76.92)

Table 2. Characteristics associated with anxiety scores and frequencies of anxiety symptoms

Characteristics	Anxiety score		Anxiety (BAI≥8)	
	median (min-max) or r value	P value	n (%) or median (min-max)	P value

Gender
  Male
  Female
	2 (0-33)
	8 (0-59)
		0.001	8 (24.24)
			51 (52.58)
				0.005

Age	0.212	0.016	33 (21-52)	0.022

Marital status
  Married
  Single
	9.50 (0-59)
	5 (0-45)
		0.013	43 (56.58)
			16 (29.63)
				0.002

Occupation
  Physician/Dentist
  Nurse/ technician
	4 (0-32)
	8 (0-59)
		0.014	6 (20.69)
			53 (52.48)
				0.002

Year of working	0.246	0.005	10 (1-32)	0.006

Organic disease
  Yes
  No
	16.50 (0-59)
	5 (0-45)
		0.010	17 (65.38)
			42 (40.38)
				0.022

Psychiatric illness
  Yes
  No
	8 (0-34)
	6 (0-59)
		0.392	6 (50)
			53 (44.92)
				0.736

What role did you take on the mobile health unit?
  Nasopharyngeal sampling
  Helpful staff
	6 (0-59)
	7 (0-39)
		0.924	36 (42.86)
			23 (50)
				0.434

Number of people taken nasopharyngeal swab sample	0.267	0.014	167.50 (10-650)	0.018
Weekly working time (hour)	-0.066	0.456	48 (8-70)	0.260
Working time in the mobile health unit (day)	0.254	0.005	30 (1-150)	0.030

Do you think your protective equipment is sufficient?
  Yes
  No
	6 (0-59)
	13 (0-34)
		0.330	53 (44.17)
			6 (60)
				0.262

Have you suspected you had COVID-19 at any time?
  Yes
  No
	11 (0-59)
	4 (0-45)
		<0.001	37 (53.62)
			22 (36.07)
				0.045

Have you ever worried about transmitting COVID-19 to your family or friends?
  Yes
  No
	7 (0-59)
	2 (0-45)
		0.037	55 (48.25)
			4 (25)
				0.080

Has any of your family or friends been diagnosed with COVID-19?
  Yes
  No
	16.50 (0-42)
	5 (0-59)
		0.003	19 (63.33)
			40 (40)
				0.024

Table 3. Characteristics associated with depression scores and frequencies of depression symptoms

Characteristics	Depression score		Depression (BDI≥10)	
	median (min-max) or r value	P value	n (%) or median (min-max)	P value
Gender 　Male 　Female	6 (0-19) 13 (0-46)	<0.001	8 (24.24) 61 (62.89)	<0,001
Age	-0,041	0.643	30 (22-52)	0.559
Marital status 　Married 　Single	12.50 (0-46) 9 (0-33)	0.380	43 (56.58) 26 (48.15)	0.343
Occupation 　Physician/dentist 　Nurse/ technician	7 (0-30) 11 (0-46)	0.253	12 (41.38) 57 (56.44)	0.152
Year of working	0.084	0.340	7 (1-32)	0.229
Organic disease 　Yes 　No	11 (2-46) 10 (0-38)	0.345	15 (57.69) 54 (51.92)	0.598
Psychiatric illness 　Yes 　No	14.50 (2-32) 10 (0-46)	0.179	9 (75) 60 (50.85)	0.110
What role did you take on the mobile health unit? 　Nasopharyngeal sampling 　Helpful staff	10 (0-46) 10.50 (0-32)	0.577	43 (51.19) 26 (56.52)	0.560
Number of people taken nasopharyngeal swab sample	0.093	0.398	150 (10-650)	0.581
Weekly working time (hour)	0.119	0.177	48 (8-90)	0.275
Working time in the mobile health unit (day)	0.367	<0.001	40 (1-150)	0.001
Do you think your protective equipment is sufficient? 　Yes 　No	10 (0-46) 10.50 (4-32)	0.750	64 (53.33) 5 (50)	0.548
Have you suspected you had COVID-19 at any time? 　Yes 　No	12 (0-46) 9 (0-33)	0.023	41 (59.48) 28 (45.90)	0.123
Have you ever worried about transmitting COVID-19 to your family or friends? 　Yes 　No	11 (0-46) 7.50 (0-33)	0.097	63 (55.26) 6 (37.50)	0.182
Has any of your family or friends been diagnosed with COVID-19? 　Yes 　No	15 (0-38) 9.50 (0-46)	0.110	19 (63.33) 50 (50)	0.199

The frequency and severity of sleep disorders were higher in MHUs with organic diseases. Participants who suspect they have had COVID-19 at any time and were concerned about transmitting COVID-19 to their family or friends had higher sleep quality scores. Anxiety severity and frequency increased with increasing age, years of working, the number of people sampled, and the duration of working in the MHUs (Table 4).

Table 4. Characteristics associated with sleep quality scores and frequencies of sleep disturbances

Characteristics	Sleep quality score		Poor sleep quality (PSQI>5)	
	median (min-max) or r value	P value	n (%) or median (min-max)	P value

Gender
  Male
  Female
	4 (0-12)
	6 (1-18)
		0.100	14 (42.42)
			51 (52.58)
				0.314

Age	0.233	0.008	33 (23-52)	0.006

Marital status
  Married
  Single
	6 (0-18)
	5 (0-17)
		0.091	41 (53.95)
			24 (44.44)
				0.286

Occupation
  Physician/Dentist
  Nurse/ technician
	5 (0-12)
	6 (0-18)
		0.567	14 (48.28)
			51 (50)
				0.833

Year of working	0.287	0.001	10 (1-32)	0.001

Organic disease
  Yes
  No
	7.50 (3-14)
	5 (0-18)
		0.047	19 (73.08)
			46 (44.23)
				0.009

Psychiatric illness
  Yes
  No
	8.50 (3-16)
	5 (0-18)
		0.123	9 (75)
			56 (47.46)
				0.069

What role did you take on the mobile health unit?
  Nasopharyngeal sampling
  Helpful staff
	6 (0-18)
	4 (0-17)
		0.081	46 (54.76)
			19 (41.30)
				0.142

Number of people taken nasopharyngeal swab sample	0.266	0.015	167.50 (20-650)	0.008
Weekly working time (hour)	0.135	0.125	50 (3-90)	0.277
Working time in the mobile health unit (day)	0.343	<0.001	60 (1-150)	<0.001

Do you think your protective equipment is sufficient?
  Yes
  No
	6 (0-18)
	4.50 (2-16)
		0.565	61 (50.83)
			4 (40)
				0.510

Have you suspected you had COVID-19 at any time?
  Yes
  No
	6 (0-18)
	5 (0-12)
		0.041	40 (57.97)
			25 (40.98)
				0.053

Have you ever worried about transmitting COVID-19 to your family or friends?
  Yes
  No
	6 (0-18)
	3 (0-11)
		0.025	60 (52.63)
			5 (31.25)
				0.109

Has any of your family or friends been diagnosed with COVID-19?
  Yes
  No
	5.50 (0-18)
	5.50 (0-17)
		0.683	15 (50)
			50 (50)
				1.000

Discussion

As a result of our study, it was observed that 45% of the HCWs in charge of taking NSS for COVID-19 screening in Rize, Turkey had anxiety symptoms; 53% had depression symptoms, and 50% had sleep disturbance. Although we cannot find a similar study conducted on sampling HCWs in the literature, there are studies showing the mental status of healthcare professionals during the pandemic process. The frequencies of anxiety and depression vary in these studies. For example, in a study conducted with over five thousand hospital workers in Wuhan in the first months of the pandemic, the frequency of depression was reported as 14% and anxiety frequency as 24%.[4] In another study conducted in various hospitals throughout China, the frequency of depression was 35%, and the frequency of anxiety was 16%.[11] Anxiety and depression rates are higher in our study, and the findings are very similar to two other studies conducted in China. In these studies, the frequencies of anxiety and depression were determined as 44% and 51%, respectively.[12,13] In a study conducted in a pediatric hospital in Wuhan, where the frequency of anxiety was determined as 9% and the frequency of depression as 25%, poor sleep quality was reported in 39% of HCWs, while in another study involving many hospitals in the Hubei region, 72% of HCWs had sleep disturbance.[3,14] In our study, the rate of sleep disturbance is 50%. Besides the working hours of the participants and the scale cut-off values used, the severity of psychological symptoms may be the reasons for the difference.

In various studies conducted during the pandemic, it has been shown that anxiety, depression, and sleep problems are more frequent and severe in female HCWs.[4, 11-17] Similarly, in our study, psychological symptoms were more frequent in women, and scale scores were also higher (Table 2, Table 3). However, there was no significant difference in sleep quality (Table 4). In previous studies, it has been revealed that depression and anxiety are more common in women than men, and it was emphasized that the differences between the effects of sex hormones and behavioral patterns might cause this.[18-21] In our study, no relationship was found between marital status and depressive symptoms or sleep quality, but anxiety symptoms were found to be more frequent and more severe in married individuals (Table 2, Table 3, Table 4). Considering this aspect, our study contradicts the study of Zhang et al., in which being single was determined as a risk factor for anxiety.[15] When examined, married HCWs were more likely to be concerned about transmitting COVID-19 to family or friends. This situation may have revealed this difference. In a study conducted during the pandemic, it was reported that younger healthcare professionals had less risk of anxiety,[11] in another study, working for over 10 years was stated as a risk factor for anxiety.[4] In another study conducted by Zhang et al., it was stated that having an organic disease in HCWs is a risk factor for anxiety, depression, and sleep disorder.[15] Again, in the study of Zhu et al., an organic disease was expressed as a risk factor for anxiety.[4] In our study, in parallel with these findings, it was observed that anxiety and sleep disorders were more frequent and severe in older, had more years of work and with organic diseases (Table 2, Table 4).

It was observed that the severity and frequency of anxiety and sleep disorders increased as the number of people sampled by healthcare professionals increased (Table 2, Table 4). Depression symptoms were added to this with the prolongation of the working time in the MHUs (Table 3). This result is a clear indication of the pressure that such a risky task creates on healthcare professionals.

As a result of our study, it was seen that almost all the participants thought that their protective equipment was sufficient. However, we found that more than half of them suspect that they have had COVID-19 at any time and that 87% were concerned about transmitting COVID-19 to their family or friends (Table 1). The frequency and severity of anxiety were higher in those who suspected they had COVID-19 (Table 2). In addition, depression and sleep quality scores were also higher (Table 3, Table 4). Anxiety and sleep quality scores were higher in those who reported worrying about infecting their family or friends (Table 2, Table 4). Studies have reported that the concern of being infected or infecting their relatives increases psychological distress and sleep problems.[4, 13, 17, 22, 23] There are studies showing that having COVID-19 positivity in family members or friends of HCWs increases the risk of anxiety and depression.[4,17] Similarly, in our study, the frequency and severity of anxiety were higher in these HCWs than in others.

This study has several limitations. First, study data were obtained from a cross-sectional design conducted over a one-month period. With the fluctuating course of the pandemic, the working tempo of healthcare workers, as well as mental health symptoms, may vary. Therefore, longer-term studies are needed to examine the psychological impact of this sample. Also, causal inferences are difficult to draw because of the cross-sectional design. Second, the participants were selected from HCWs working in Rize Province. Therefore, the findings cannot be attributed to Turkey. There is a need for advanced multi-center studies to be conducted in different geographical regions. Another limitation is that a web-based questionnaire was used for the study to prevent COVID-19 transmission. It is recommended to use clinical interviews in future studies to make psychological evaluations more accurate and comprehensive. In our opinion, the last limitation was the absence of a control group in our study.

The MHUs that are tasked with taking NSS in order to make effective filiation, which is one of the most powerful weapons we have in the fight against COVID-19, are one of the groups that face the highest risk of contact. As a result of our study, high rates of depression, anxiety and sleep disturbances were observed in these HCWs. Protecting the mental health of HCWs is an important component of combating the epidemic. Special interventions to protect mental health will be beneficial for HCWs at risk of transmission, especially women, older people, and those with organic diseases.

Ethical Considerations: Ethical approval of this study was given by the Non-Interventional Clinical Research Ethics Committee of Recep Tayyip Erdogan University with the decision dated 16.07.2020 and numbered 2020/169.

Conflict of Interest: The authors declare no conflict of interest.

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