RESEARCH ARTICLE

Turkish Journal of Psychiatry 2021;32(4):225-234

https://doi.org/10.5080/u25827

The Mental Health of Healthcare Professionals During the COVID-19 Pandemic

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SUMMARY

Objective: The aim of this study is to investigate the anxiety, depression, insomnia and post traumatic stress disorder (PTSD) symptoms and the assocaited sociodemographic, clinical and professional factors during the COVID-19 pandemic in healthhcare workers.

Method: A total of 509 participants joined an online survey to complete the data acquisition tools consisting of a Sociodemographic and Clinical Questionnaire, the Hospital Anxiety and Depression Scale (HADS), the Insomnia Severity Index (ISI) and the Post Traumatic Stress Disorder-Short Scale (PTSD-SS).

Results: The 509 participants of the study consisted of physicians (69.2%) and nurses (30.8%). On the basis of the scores above the cut-off points of the pscyhometric scales used, the mental symptoms of the participants were ranked as 54.2% on depression, 26.3% on anxiety, 20.8% on insomnia and 8.8% on PTSD. The corresponding scores of the 20-30 year old, the female and the nursing participants were significantly higher as compared to the others ($p<0.001$, for all). Significant differences were not found in these scores with respect to working or not working directly with COVID-19 patients, or having a family member with or without COVID-19 infection ($p>0.05$). Having a history of suspected COVID-19 infection was significantly associated with insomnia ($p=0.026$ and PTSD ($p=0.008$). Also, the anxiety and PTSD scores of the participants with a history of mental disorder diagnosis were significantly higher in comparison to the others ($p<0.001$).

Conclusion: The results indicated that females, nurses, participants in the 20-30 year age group and with a history of mental disorder diagnosis were in the high risk group for impaired mental health, irrespective of their professional positions. Close monitoring and early intervention are essential for these high-risk individuals.

Keywords: Covid-19, healthcare professionals, anxiety, depression, insomnia, post-traumatic stress

INTRODUCTION

After the announcement in December 2019 of the spread in cases of severe pneumonia of unknown aetiology and probably related to viral infection in the Chinese city of Wuhan, this condition was named as the 'corona virus disease-19' (COVID-19) by the World Health Organization (WHO). As a result of the rapid spread of the disease, this outbreak was declared as a global pandemic by the WHO on March 11, 2020. Since then, the disease has been spreading rapidly and claiming over thousands of lives over the world. Currently, the total number of positive cases is in excess of 4,000,000 and the total number of deaths has reached over 300,000. The emergent nature of the COVID-19 pandemic and the rapid contagion around the world have brought several pervasive and long-term problems including sense of uncertainty, information pollution, high death rates in certain groups, lack of effective therapies, measures of forced lockdown and curfews with adverse effects on the mental health of the general population and particularly the healthcare professionals (Xiang et al. 2020, Yang et al. 2020).

Healthcare professionals have to forgo the measures of social and physical distancing by having to care for the COVID-19 patients are highly exposed to infection. Recently in Italy 20% of the healthcare professionals have been infected with COVID-19 and some have lost their lives (Remuzzi and Remuzzi 2020). The psychological effect of this critical

Received: 29.06.2020, **Accepted:** 10.11.2020, **Available Online Date:** 27.09.2021

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situation on the healthcare professionals cannot be overlooked. It has been shown that the healthcare professionals directly involved in the diagnosis and care of COVID-19 patients are at increased risk of developing various psychological and mental symptoms (Lai et al. 2020). The psychological effect is aggravated by increasing duties, prolonged work shifts, shortage of personal protective equipment (PPE), death of their patients and colleagues and the fear of infecting their families. Previous research demonstrated increased levels of anxiety and depression in the short term and symptoms of PTSD in the long-term in healthcare workers during the Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) outbreaks (Lee et al. 2007, Lee et al. 2018). Current studies have also demonstrated significantly high prevalence of depression, anxiety, insomnia and somatic symptoms in healthcare workers during the COVID-19 pandemic (Chew et al. 2020, Huang et al. 2020, Huang and Zhao 2020, Lai et al. 2020). There is scanty documented data and therefore little is known about the psychological needs of healthcare professionals during this global disaster.

The first COVID-19 case in Turkey was diagnosed on March 11, 2020. According to the data disclosed by the Ministry of Health, the total number of positive cases was 139.771 and 3.841 individuals had lost their lives as of May 11, 2020. The Turkish Medical Association announced the death of 24 healthcare professionals from COVID-19 (Turkish Medical Association 2020). Psychological stress is believed to have different outcomes in different cultures. Data on the mental health of the healthcare workers during the pandemic in Turkey are currently very limited indicating the urgent need for assessing the psychological effect of the pandemic and the related risk factors.

The different departments where healthcare workers are coping with the pandemic include the COVID-19 intensive care units (ICU), COVID-19 inpatient clinics and COVID-19 outpatient clinics/filiation teams. The healthcare professionals carrying out the usual healthcare services and working in the general wards are also exposed to the risks of contagion. Alterations in their working conditions during the pandemic also cause psychological distress. Research evaluating the mental effect of the pandemic on the basis of healthcare work in different capacities is also scarce. Therefore, the present study has aimed to investigate the anxiety, depression, insomnia, and PTSD levels of physicians and nurses working in different wards during COVID-19 pandemic and to determine the associated risk factors.

The main hypotheses of the present study are listed as follows:

1. Healthcare workers engaged in the COVID-19 intensive care units, wards and the inpatient or outpatient clinics/ filiation teams are more prone to develop depression, anxiety, insomnia and PTSD symptoms as compared to their colleagues working in services excluding COVID-19 care
2. Mental symptoms are more prevalent among nurses in comparison to physicians
3. Mental symptoms are more prevalent among healthcare workers of younger age, of female gender and with a history of suspected COVID-19 infection
4. Prevalence of mental symptoms is higher among the healthcare workers with a history of mental disorder as compared to those without such a history.

METHOD

Study Design

Given the high rate of contagion, the study was designed as an online survey so as to avoid social/physical contact with the participants. Many hospitals in different regions of Turkey were appointed specifically to function as pandemic centers with staff employed in the service of COVID-19 patients. The prepared survey forms were shared online with the social media groups which nurses and physicians are members of. All participants provided an online informed consent and completed the documents during May 1-13, 2020 without revealing their identity. The study protocol was approved by the Yuzuncu Yıl University Noninterventional Clinical Research Ethics Committee, and the Turkish Ministry of Health- Health Services General Directorate COVID-19 Research Assessment Committee.

Data Acquisition Tools

The survey document comprised a Questionnaire on Sociodemographic including items on mental health history, the Hospital Anxiety and Depression Scale (HADS), the Insomnia Severity Index (ISI) and the PTSD-Short Scale (PTSD-SS).

Sociodemographic Questionnaire: This questionnaire was designed to acquire information on the participant's age, gender, marital status, occupation in the category of ''nurse" or ''physician", whether they had participated in the diagnosis or treatment of COVID-19 at least once till the date of the survey, which of the services including the COVID-19 ICU, COVID-19 inpatient clinics, COVID-19 outpatient clinics/ filiation teams, and the general wards for healthcare services excluding COVID-19 care they had worked in; whether they have a history of psychiatric diagnosis, any COVID-19 positive member in family, any past suspicions of having contracted with COVID-19.

Participants who had temporarily worked in the COVID-19 related services were also categorized as having a directly

COVID-19 related duty. If the participant reported having worked in more than one department, the specific department worked in for the longest duration was asked to be marked. A suspicion of having contracted COVID-19 was accepted as having had a PCR test with the suspicion of exposure to the virus or having been quarantined for this reason.

Relevant literature demonstrates that the relationship between age and psychopathology is not linear by showing two peak zones including younger and older age groups. The lack of experience by the younger individuals newly starting in healthcare work and the risk of being more severely affected by the infection among the older healthcare professionals may be associated with additional vulnerability to psychopathology. Therefore, age groups were categorized in the present study.

The Hospital Anxiety and Depression Scale (HADS): The HADS, developed by Zigmond and Snaith (1983) to assess the risk and the changes in the severity of anxiety and depression, is a 4-point Likert type of scale consisting of 7 odd-numbered items representing the anxiety subscale (HADS-A) and 7 even-numbered items representing the depression subscale (HADS-D). Scoring of each item is based on responses ranging from 0 (= absence of symptoms) to 3 (= maximal symptoms), and the maximum total score on each subscale is 21. The validity and reliability of the Turkish language version of HADS was reported by Aydemir (1997), and the cut-off values for HADS-A and HADS-D were determined as 7 and 10, respectively.

The Insomnia Severity Index (ISI): The ISI is used as both a self-report and physician-rated scale for assessing insomnia. It comprises 7 items scored by a five-point (0 - 4) Likert system, with the total score ranging from 0 to 28. Scores of 0-7 indicate clinically insignificant insomnia, 8-14 indicate subthreshold insomnia, 15-21 indicate moderate clinical insomnia and 22-28 indicate severe clinical insomnia. The validity and reliability study of the Turkish language version of the ISI was carried out by Boysan et al.(2010), who determined an internal consistency coefficient of 0.79.

Posttraumatic Stress Disorder-Short Scale (PTSD-SS): PTSD-SS was designed by LeBeau et al. (2014) to assess the presence and the severity of PTSD. It may be used as a screening tool and complies with the PTSD diagnostic criteria in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). PTSD-SS is a self-report scale consisting of 9 items with four-point Likert-type scoring between 0, representing absence of symptoms, and 4, representing maximal symptoms. The total score ranges from 0 to 36, with scores ≥24 indicating clinical significance. Based on the methodology of the previous studies (Sezgin and Punamäki 2020, Türkmen et al. 2020), the COVID-19 and the pandemic were depicted as the traumatic event; and the instruction of the scale was modified as "During the COVID-19 pandemic, many individuals had a period of intensive care or were deceased due to the infection. How much have you been bothered during the past seven days by each of the following problems that occurred or became worse after these stressful events/experiences?" The validity and reliability study of the Turkish language version of PTSD-SS was reported by Evren et al. (2016), who determined an internal consistency coefficient of 0.87.

Statistical Analysis

The STATA version 13.1 (Stata Corp, USA) was used for the statistical analyses. A value of $p<0.05$ was accepted as to indicate statistical significance. The HADS-A, HADS-D, ISI, and PTSD-SS scores of the participants showed non-normal distribution and were expressed in terms of the median and the 25-75% percentile. The participants with scores above and below the cut-off values of the scales used in the study were compared on the basis of their sociodemographic and clinical characteristics and exposure to COVID-19 using the Chi-square test, and the results were given together with the effect size values (Cramer's V). The subgroups were compared in terms of the severity of psychopathology using the non-parametric Mann-Whitney U test or the Kruskal-Wallis test as appropriate for comparing two or more groups. Multivariate Logistic Regression Analysis was performed to determine the risk factors associated with increased HADS-A, HADS-D, ISI, and PTSD-SS scores by using as confounding variables the data on age, gender, marital status, previous diagnosis of mental disorder, profession (physician/nurse), personal history of COVID-19 suspicion and the working position (in the COVID-19 ICU, COVID-19 inpatient clinics, COVID-19 outpatient clinics/filiation teams or departments excluding COVID-19 care). The results were given together with the odds ratio (OR) and the 95% confidence intervals (CI).

RESULTS

Sociodemographic characteristics

The 509 participants comprised 352 (69.2%) physicians and 157 (30.8%) nurses with a higher proportion of participants (48.7%, n=248) aged 31-40 years old, (58%, n=295) males, (66.6%, n=339) being married. 159 (31.2%) participants had a past diagnosis of a mental disorder, 179 (35.2%) had a history of suspected COVID-19 infection and 27 (5.3%) had a COVID-19 positive member of the family. The majority (n=317; 62.3%) of the participants had duties directly related to COVID-19 and the remaining 192 (37.7%) worked in the services excluding COVID-19 care (Table 1).

Table 1. Demographic, Clinical and Professional Data of the Participants

		Profession		Department			
	Total	**Nurse**	**Physician**	**Non-COVID-19 department**	**COVID-19 outpatient clinic/ other***	**COVID-19 inpatient clinic**	**COVID-19 ICU**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Total		157 (30.8)	352 (69.2)	192 (37.7)	131 (25.8)	236 (26.7)	50 (9.8)
Age (years)							
20-30	167 (32.8)	93 (59.3)	74 (21.0)	56 (29.2)	39 (29.8)	57 (41.9)	15 (30.0)
31-40	248 (48.7)	47 (29.9)	201 (57.1)	95 (49.5)	69 (52.7)	56 (41.2)	28 (56.0)
41-50	73 (14.4)	12 (7.6)	61 (17.3)	29 (15.1)	19 (14.5)	19 (14.0)	6 (12.0)
51-64	21 (4.1)	5 (3.2)	16 (4.6)	12 (6.2)	4 (3.0)	4 (2.9)	1 (2.0)
Gender							
Male	295 (58.0)	53 (33.8)	242 (68.7)	105 (54.7)	77 (58.8)	84 (61.8)	29 (58.0)
Female	214 (42.0)	104 (66.2)	110 (31.3)	87 (45.3)	54 (41.2)	52 (38.2)	21 (42.0)
Marital Status							
Married	339 (66.6)	80 (51.0)	259 (73.6)	138 (71.9)	80 (61.1)	82 (60.3)	39 (78.0)
Non-married	170 (33.4)	77 (49.0)	93 (26.4)	54 (28.1)	51 (38.9)	54 (39.7)	11 (22.0)
Previous mental disorders							
No	350 (68.8)	119 (75.8)	231 (65.6)	129 (67.2)	86 (65.6)	99 (72.8)	36 (72.0)
Yes	159 (31.2)	38 (24.2)	121 (34.4)	63 (32.8)	45 (34.4)	37 (27.2)	14 (28.0)
COVID-19 suspicion							
No	330 (64.8)	98 (62.4)	232 (65.9)	141 (73.4)	70 (53.4)	92 (67.7)	27 (54.0)
Yes	179 (35.2)	59 (37.6)	120 (34.1)	51 (26.6)	61 (46.6)	44 (32.4)	23 (46.0)
COVID-19 positivity in family							
No	482 (94.7)	148 (94.3)	334 (94.9)	182 (94.8)	127 (96.9)	127 (93.4)	46 (92.0)
Yes	27 (5.3)	9 (5.7)	18 (5.1)	10 (5.2)	4 (3.1)	9 (6.6)	4 (8.0)

*Other departments include the emergency services and filiation teams
COVID-19: Coronavirus disease 2019, ICU: Intensive care unit

Evaluation of the participant scores above the cut-off values of psychometry on anxiety, depression, insomnia and PTSD, and associated factors

The number of participants with scores above the cut-off values were 276 (54.2%) on the HADS-A, 134 (26.3%) on the HADS-D, 106 (20.8%) on the ISI and 45 (8.8%) on the PTSD-SS. The rates of participants above the cut-off values on all scales were significantly higher in the participants aged 20-30 years, in females, and in nurses. When compared to the physicians, more nurses had scores above the cut-off values on the HADS-D (n=110; 70.1%), the HADS-A (n=72; 45.9%), the ISI (n=65; 41.4%) and on PTSD-SS (n=32; 20.4%), (p<0.001, for all). Significant differences were not found between the rates of the healthcare professionals above the cut-off values with or without a directly COVID-19 related duty and with or without a COVID-19 positive member of the family (p>0.05, for all). The rates of the participants working in intensive care units (ICUs) with scores above the cut-off values in all scales were higher when compared to the participants working in other departments, but these differences were not significant (p>0.05, for all). The rates of the participants with a history of mental disorder above the cut-off values diagnosis were significantly higher only on the HADS-A scale (p=0.002). Furthermore, the rates of the participants above the cut-off values with a personal history of suspected COVID-19 were significantly higher on the ISI and PTSD-SS scales (p=0.026 and p=0.008, respectively) (Table 2).

Comparison of the severity of anxiety, depression, insomnia, and PTSD scores between subgroups

The median scores (the interquantile ranges) of the entire participants on the 4 psychometric tests were as follows: 8 (4-11) on the HADS-D; 8 (5-11) on the HADS-A; 9 (5-13) on the ISI and 9 (4-17) on PTSD-SS. Similarly to the results on the subgroups with scores above the cut-off values of these 4 scales , the median value of the scores of all the participants aged 20-30 years, female participants and nurses were significantly higher that the corresponding scores of the other participants. Similarly, the participants with a history of suspected COVID-19 infection had the highest median score on the ISI and PTSD-SS; and this subgroup, when compared to those who did not share this experience, also

Table 2. Comparison of the Participant Subgroups with Scores Above and Below the Cutoff Values of the Four Psychometric Scales

	HADS-D[a] n (%)					HADS-A[b] n (%)					ISI[c] n (%)					PTSD-SS[d] n (%)				
	Lower	Higher	χ^2	V	P	Lower	Higher	χ^2	V	p	Lower	Higher	χ^2	V	p	Lower	Higher	χ^2	V	p
Age (years)																				
20-30	61 (36.5)	106 (63.5)	8.7	0.13	0.01	98 (58.7)	69 (41.3)	29.9	0.25	<0.001	110 (65.9)	57 (34.1)	27.3	0.23	<0.001	142 (85.0)	25 (15.0)	11.6	0.15	0.003
31-40	123 (49.6)	125 (50.4)				197 (79.4)	51 (20.6)				215 (86.7)	33 (13.3)				233 (93.9)	15 (6.1)			
41-64	49 (52.1)	45 (47.9)				80 (85.1)	14 (14.9)				78 (83.0)	16 (17.0)				89 (94.7)	5 (5.3)			
Gender																				
Male	147 (49.8)	148 (50.2)	4.6	0.15	0.03	243 (82.4)	52 (17.6)	27.4	0.23	<0.001	246 (83.4)	49 (16.6)	7.6	0.12	0.006	281 (95.2)	14 (4.8)	14.6	0.17	<0.001
Female	86 (40.2)	128 (59.8)				132 (61.7)	82 (38.3)				157 (73.4)	57 (26.6)				183 (85.5)	31 (14.5)			
Department																				
Non-COVID-19 department	81 (42.2)	111 (57.8)	3.3	0.08	0.3	136 (70.8)	56 (29.2)	3.4	0.08	0.3	161 (83.8)	31 (16.2)	5.6	0.1	0.14	175 (91.2)	17 (8.8)	0.40	0.02	0.9
COVID-19 outpatient clinic/other*	63 (48.1)	68 (51.9)				103 (78.6)	28 (21.4)				104 (79.4)	27 (26.6)				121 (92.4)	10 (7.6)			
COVID-19 inpatient clinic	69 (50.7)	67 (49.3)				102 (75.0)	34 (25.0)				102 (75.0)	34 (25.0)				123 (90.4)	13 (9.6)			
COVID-19 ICU	20 (40.0)	30 (60.0)				34 (68.0)	16 (32.0)				36 (72.0)	14 (28.0)				45 (90.0)	5 (10.0)			
Profession																				
Nurse	47 (29.9)	110 (70.1)	22.9	0.22	<0.001	85 (54.1)	72 (45.9)	44.7	0.3	<0.001	92 (58.6)	65 (41.4)	58.3	0.34	<0.001	125 (79.6)	32 (20.4)	37.5	0.27	<0.001
Physician	186 (52.9)	166 (47.2)				290 (82.4)	62 (17.6)				311 (88.3)	41 (11.7)				339 (96.3)	13 (3.7)			
COVID-19 suspicion																				
No	159 (48.2)	171 (51.8)	2.2	0.06	0.14	248 (75.1)	82 (24.9)	1.1	0.04	0.3	271 (82.1)	59 (17.9)	4.9	0.1	0.026	309 (93.6)	21 (6.4)	7.1	0.12	0.008
Yes	74 (41.3)	105(58.6)				127 (70.9)	52 (29.1)				132 (73.7)	47 (26.3)				155 (86.6)	24 (13.4)			
COVID-19 positivity in family																				
No	222 (46.1)	260 (53.9)	0.3	0.02	0.6	355 (73.6)	127 (26.4)	0.01	0.01	0.9	381 (79.1)	101 (20.9)	0.09	0.01	0.7	439 (91.1)	43 (8.9)	0.07	0.01	0.8
Yes	11 (40.7	16 (59.3)				20 (74.1)	7 (25.9)				22 (81.5)	5 (18.5)				25 (92.6)	2 (7.4)			
Previous mental disorders																				
No	167 (47.7)	183 (52.3)	1.7	0.06	0.2	272 (77.7)	78 (22.3)	9.4	0.14	0.002	277 (79.1)	73 (20.9)	0.01	0.01	0.9	323 (92.3)	27 (7.7)	1.8	0.06	0.2
Yes	66 (41.5)	93 (58.5)				103 (64.8)	56 (35.2)				126 (79.2)	33 (20.8)				141 (88.7)	18 (11.3)			

[a]Cutoff value for HADS-D:>7
[b]Cutoff value for HADS-A:>10
[c]Cutoff value for ISI: ≥15 (moderate and severe)
[d]Cutoff value for PTSD-SS:≥24
HADS-D: the Hospital Anxiety and Depression Scale-Depression, HADS-A: the Hospital Anxiety and Depression Scale-Anxiety, ISI: the Insomnia Severity Index, PTSD-SS: the Post Traumatic Stress Disorder -Short Scale, ICU: Intensive Care Unit *Other departments include the emergency services and filiation teams

Table 3. Comparison of the Severity of Anxiety, Depression, Insomnia, and PTSD Symptoms between the Participant Subgroups In Terms of the Relevant Psychometric Scale Scores

	HADS-D			HADS-A			ISI			PTSD-SS		
	Median (25-75% percentile)	z/χ^{2}*	p	Median (25-75% percentile)	z/χ^{2}*	P	Median (25-75% percentile)	z/χ^{2}*	P	Median (25-75% percentile)	z/χ^{2}*	p
Age (years)												
20-30	9 (6-12)	14.7	<0.001	9 (6-12)	19.2	<0.001	12 (8-16)	44.8	<0.001	13 (8-19)	28.1	<0.001
31-40	8 (4-10)			7 (4-10)			8 (4-12)			9 (3-15)		
41-64	7 (4-11)			7 (4-10)			9 (4-12)			8.5 (4-16)		
Gender												
Male	8 (4-10)	-2.8	0.006	7 (4-10)	-5.2	<0.001	9 (4-13)	-3.5	<0.001	9 (3-15)	-4.1	<0.001
Female	9 (5-12)			9 (6-12)			11 (6-15)			12 (6-19)		
Department												
Non-COVID-19 department	8 (5-11)	2.7	0.4	8 (5-11)	4.2	0.2	9 (5-13)	2.2	0.5	10 (4-17)	1.6	0.7
COVID-19 outpatient clinic/ othere	8 (4-11)			7 (4-10)			9 (4-14)			10 (4-17)		
COVID-19 inpatient clinic	7 (4-10)			8 (5-10.5)			9.5 (5-14.5)			8.5 (4-17)		
COVID-19 ICU	8 (5-12)			9 (4-11)			10.5 (6-15)			9 (6-16)		
Profession												
Nurse	10 (7-13)	6.4	<0.001	10 (7-13)	6.6	<0.001	13 (10-17)	9.8	<0.001	15 (9-22)	7.8	<0.001
Physician	7 (4-10)			7 (4-9)			8 (4-11)			8 (3-14)		
COVID-19 suspicion												
No	8 (4-10)	-2.4	0.01	8 (5-10)	-2.5	0.01	9 (5-13)	-2.8	0.005	9 (4-16)	-2.9	0.003
Yes	8 (5-11)			9 (5-11)			10 (7-15)			11 (6-19)		
COVID-19 positivity in family												
No	8 (4-11)	-0.7	0.5	8 (5-11)	-0.5	0.6	9 (5-13)	-0.3	0.7	9 (4-17)	-0.5	0.6
Yes	10 (5-13)			9 (6-11)			11 (4-13)			11 (3-18)		
Previous mental disorders												
No	8 (4-11)	-1.9	0.053	7 (4-10)	-4.1	<0.001	9 (5-13)	-1.8	0.08	9 (4-15)	-4.0	<0.001
Yes	9 (5-11)			9 (7-12)			10 (6-14)			12 (7-19)		

*the Mann-Whitney U Test or the Kruskal Wallis Test as appropriate
ᶜOther departments include the emergency services and filiation teams
HADS-D: the Hospital Anxiety and Depression Scale-Depression, HADS-A: the Hospital Anxiety and Depression Scale-Anxiety, ISI: the Insomnia Severity Index, PTSD-SS: the Post Traumatic Stress Disorder -Short Scale, ICU: Intensive Care Unit

had significantly higher scores on HADS-D [8 (5-11) vs 8 (4-10); p=0.01]; and HADS-A [9 (5-11) vs 8 (5-10); p=0.01)]. Participants with a history of mental disorder in comparison to the participants without this history had significantly higher median scores on the HADS-A [9 (7-12) vs 7 (4-10); p<0.001] and on PTSD-SS [12 (7-19) vs 9 (4-15); p<0.001] (Table 3).

Analysis of the factors associated with anxiety, depression, insomnia, and PTSD by multivariate logistic regression models

Results of the multivariate logistic regression models showing the relationships between the scores above the cut-off values of the 4 psychometric tests used and the sociodemographic, clinical and professional data of the participants to detect the potential risk factors affecting mental health are shown in Table 4. Significant relationships were indicated between the HADS-D score and being 20-30 years old (p=0.04), working as a nurse (p<0.001) and being married (p=0.02); between the HADS-A score and being 20-30 years old (p=0.002), being female (p=0.003), working as a nurse (p<0.001) and having a history of mental disorder (p<0.001); between the ISI score and working as a nurse (p<0.001) and working in COVID inpatient unit (p=0.03) and between PTSD-SS score and working as a nurse (p<0.001) and having a history of suspected COVID-19 infection (p=0.02) (Table 4).

Table 4. Analysis of the Factors Associated With Anxiety, Depression, Insomnia, and PTSD Symptoms by Multivariate Logistic Regression Models

	HADS-D[a]		HADS-A[b]		ISI[c]		PTSD-SS[d]	
	OR (95% CI)*	*p*	OR (95% CI)*	*p*	OR (95% CI)*	*p*	OR (95% CI)*	p
Age (years)								
20-30	Ref		Ref		Ref		Ref	
31-40	1.2 (0.7-1.9)	0.4	1.7 (0.9-3.4)	0.1	0.7 (0.4-1.4)	0.3	1.1 (0.4-3.2)	0.9
41-64	1.8 (1.1-3.3)	0.04	3.3 (1.6-6.8)	0.002	1.7 (0.8-3.4)	0.2	1.5 (0.5-4.5)	0.5
Gender								
Male	Ref		Ref		Ref		Ref	
Female	1.1 (0.7-1.6)	0.6	2.0 (1.2-3.0)	0.003	1.1 (0.6-1.7)	0.8	1.9 (0.9-3.8)	0.08
Marital status								
Married	Ref		Ref		Ref		Ref	
Non-married	0.6 (0.4-0.9)	0.01	0.9 (0.6-1.5)	0.7	0.7 (0.4-1.3)	0.3	1.2 (0.6-2.5)	0.6
Previous mental disorders								
No	Ref		Ref		Ref		Ref	
Yes	1.5 (1.1-2.3)	0.04	2.4 (1.5-3.8)	<0.001	1.3 (0.8-2.1)	0.3	1.9 (0.9-3.8)	0.07
Profession								
Physician	Ref		Ref		Ref		Ref	
Nurse	2.6 (11.7-4.1)	<0.001	2.4 (1.5-3.8)	<0.001	4.7 (2.8-7.8)	<0.001	5.2 (2.4-11.2)	<0.001
COVID-19 suspicion								
No	Ref		Ref		Ref		Ref	
Yes	1.3 (0.9-1.8)	0.2	1.1 (0.7-1.7)	0.6	1.6 (0.99-2.5)	0.06	2.1 (1.1-4.1)	0.02
Department								
Non-COVID-19 department	Ref		Ref		Ref		Ref	
COVID-19 outpatient clinic/ other	0.8 (0.5-1.2)	0.3	0.6 (0.3-1.1)	0.1	1.4 (0.8-2.7)	0.3	0.7 (0.3-1.7)	0.4
COVID-19 inpatient clinic	0.7 (0.4-1.1)	0.2	0.8 (0.5-1.4)	0.4	1.9 (1.1-3.5)	0.03	1.1 (0.5-2.5)	0.8
COVID-19 ICU	0.9 (0.5-1.8)	0.8	1.1 (0.5-2.2)	0.9	1.8 (0.8-4.1)	0.1	0.8 (0.3-2.6)	0.7

*Adjusted for age, gender, marital status, previous mental disorders, profession, previous COVID-19 suspicion and department of work
[a]Cutoff value for HADS-D:>7
[b]Cutoff value for HADS-A:>10
[c]Cutoff value for ISI: ≥15 (moderate and severe)
[d]Cutoff value for PTSD-SS:≥24
[e]Other departments include the emergency services and filiation teams
HADS-D: the Hospital Anxiety and Depression Scale-Depression, HADS-A: the Hospital Anxiety and Depression Scale-Anxiety, ISI: the Insomnia Severity Index, PTSD-SS: the Post Traumatic Stress Disorder -Short Scale, OR: Odds ratio, CI: Confidence interval
Ref: Reference

DISCUSSION

This cross-sectional online survey investigated the anxiety, depression, insomnia, and PTSD symptoms and identified the risk factors for developing these symptoms by the healthcare professionals working on the diagnosis and treatment of COVID-19 patients. Prevalence of these symptoms was compared between the healthcare professionals with and without a directly COVID-19 related duty. The survey was completed by a total of 509 healthcare professionals and it was determined that 54.2%, 26.3%, 20.8%, and 8.8% of the healthcare professionals had scores above the cut-off values on the psychometric tests for depression, anxiety, insomnia, and PTSD, respectively; and, that being 20-30 years old, being female and working as a nurse entailed significant risk of developing these symptoms.

In agreement with our results, a survey on 1,257 nurses and physicians during the COVID-19 pandemic in China demonstrated prevalence of 50.4% depression, 44.6% anxiety, 34% insomnia and 71.5% distress symptoms (Lai et al. 2020). Another survey in China on 7236 individuals including healthcare professionals and others showed prevalence of 35.1%, 20.1%, and 18.2%, respectively, of generalized anxiety disorder (GAD), depressive symptoms and sleep deprivation among the healthcare professionals (Huang and Zhao 2020). Similarly, Huang et al. (2020) reported 23.04% and 27.39% prevalence of anxiety and PTSD, respectively, among their participants. A survey in India and Singapore

reported 10.6%, 15.7 and 7.4% prevalence, respectively, of clinically significant depression, anxiety and PTSD among 906 participants including physicians, nurses, pharmacists, physiotherapists, technicians, and administrative staff (Chew et al. 2020). These results and the results of our study clearly demonstrate the high rates of mental distress in healthcare professionals during the COVID-19 pandemic irrespective of cultural differences.

In our study, the high scores particularly among the nurses on all the psychometric tests showing 70.1%, 45.9%, 41.4% and 20.4% prevalence of, respectively, depression, anxiety, insomnia and PTSD symptoms are noteworthy. Similar results on all 4 symptoms have been reported by Lai et al. (2020) in females and nurses during the COVID-19 pandemic. Others also reported higher severity of anxiety and depression symptoms among nurses as compared to the physicians (Guoet al. 2020, Huang et al. 2020, Liu et al. 2020) and higher worry and tension among nurses as compared to other healthcare workers (Cai et al. 2020). A systematic review and meta-analysis of 13 studies on a total of 33,062 healthcare professionals reported that females and nurses had higher prevalence of anxiety, depression, and affective symptoms compared to other healthcare professionals (Pappa et al. 2020). These results may be partially confounded by the mostly female gender of the nurses; but, the multivariate logistic regression analyses made in our study yielded similar results irrespective of the gender factor. These results could also be ascribed to the greater risk of exposure to COVID-19 by the nurses since they spend more time on wards providing direct care to patients and collecting sputum for virus detection. Given the continual exposure to suffering, death and ethical dilemmas, nurses may be more exposed to loss of morale and psychological burden (Pappa et al. 2020).

In our study, participants aged between 20-30 years had significantly higher scores in all scales in comparison to the other participants and being under 30 years of age was found to be a risk factor for development of depression and anxiety by the multivariate logistic regression analyses to control for possible confounders. In a similar web-based cross-sectional survey evaluating GAD, depressive symptoms, and sleep quality during COVID-19 outbreak in China demonstrated significantly higher prevalence of all symptoms except lowered sleep quality among participants aged under 35 years as compared to those aged above 35 (Huang and Zhao 2020). Depression scores were found to be higher in healthcare workers aged ≤30 in a group of 38 healthcare workers working in COVID-19 services and 21 working in other hospital departments although the difference was not significant which was attributed to the small sample in the study (Liang et al. 2020). On the other hand, during the SARS outbreak, medical staff of younger age were also found to have a higher risk of developing psychiatric symptoms (Sim et al. 2004, Su et al. 2007). This vulnerability may be associated with the lack of experience in crisis management. The importance of adequate previous experience has been asserted in being prepared for crises. Stress, symptoms of burnout, and PTSD were observed in experienced healthcare workers in lower levels (Maunder et al. 2006). Our results demonstrate in agreement with results obtained in different parts of the world that younger adults are at higher risk of developing mental disturbances during the pandemic.

In our study, healthcare professionals were evaluated in subgroups on the basis of working in the 4 departments including the COVID-19 ICU, COVID-19 inpatient clinic, COVID-19 outpatient clinic/filiation teams, and non-COVID-19 services. Contrary to our hypothesis, neither the univariate nor the multivariate analyses showed significant differences in any of the psychopathological symptoms, except insomnia, among these subgroups. Differing results were reported by studies comparing the psychopathological symptoms between the frontline and the non-frontline healthcare professionals during the COVID-19 pandemic. Increased prevalence of mental symptoms in the frontline healthcare workers (Du et al. 2020, Lai et al. 2020, Liu et al. 2020,Qiet al. 2020) or, similarly to our study, lack of significant differences in depression and anxiety symptoms of these two groups of healthcare workers have been observed (Li et al. 2020, Liang et al. 2020). Comparison of the burnout among frontline physicians and nurses vindicated remarkably low incidences of 13% against the 39% in non-frontline healthcare workers, which was suggested to be an outcome of having a greater sense of control of the situation, probably having access to more timely and accurate information and a deeper sense of personal achievement by witnessing results of their care for the patients affected by COVID-19 (Wu et al. 2020). The lower prevalence of psychopathological symptoms in frontline healthcare workers could also be associated with their increased experience and adequate training. Our survey did not collect data on experience, education, sense of personal achievement, control and easy access to accurate information that are probably the protective factors against developing mental problems during the pandemic. Evaluation of these factors by future research may contribute to the preventive measures for mental health during pandemics. Hence, the results of this study show the mental effect of the pandemic on the healthcare professionals working in COVID-19 care as well as working in other services.

In our study univariate analyses showed that participants with a history of suspected COVID-19 had significantly higher scores in all test scales, and multivariate logistic regression analysis controlling for confounders showed additionally increased risk of developing PTSD. Interestingly, the risk of depression was significantly higher in married participants in comparison to the single participants while significant

differences were not found in any of the test scores of the participants with and without a COVID-19 positive member of the family. There are reports in the literature that healthcare professionals providing care for COVID-19 patients are worried about their families and fear about spreading the disease in the family which result in development of depressive symptoms and stress levels (Cai et al. 2020, Santarone et al. 2020, Xiang et al. 2020, Zhang et al. 2020) with safety of the family being the most important factor to reduce their stress (Cai et al. 2020). Contrary to our findings, Elbay et al. (2020) found that being married and having a child were associated with lower depression, anxiety, and stress scores. Being married and having family support have positive effects on mental health as well as being a source of anxiety during the pandemic, especially with the fear of spreading the disease to the family as observed in our study. Finally, the lack of significant associations with having a family member with COVID-19 may be due to the low number of participants reporting COVID-19 in the family.

The results of our study showed that having a history of mental disorder was significantly associated with the risk of PTSD and anxiety; and multivariate logistic regression analysis controlling for confounders confirmed the significance of the risk of developing anxiety. It has been known that having a history of mental disorder is a risk factor both for the recurrence of the same disorder and the emergence of others (Binbay et al. 2014, Deveci et al. 2007). There are not any studies reporting results in the literature on the association between having a history of mental disorder and the emergence of mental disorders during COVID-19 pandemic. It should be realized that healthcare professionals with a history of mental disorder are at higher risk for developing mental problems and need prompt psychosocial support.

There are limitations to consider in this study. First, the cross-sectional design renders it difficult to draw causal assumptions from the results. Second, by employing a web-based survey to avoid contagion, the sampling method of the study might have created a bias such that the participants may not represent the entire universe of the study. Third, the study only evaluated the short term acute effects of the pandemic, indicating the necessity for evaluating the long term effects of the pandemic. Fourth, data is lacking relevant information on the regions of the country where the participants were working. Therefore, regional differences across the country could not be analyzed. The fifth important limitation is not having investigated the effects of changes in types and duration of the healthcare duty on the evaluated psychopathological symptoms. The sixth limitation is testing the effects of the pandemic, a long term trauma with dimensions affecting the population differently, by using the PTSD-SS which best measures the effect of a single-defined trauma. Therefore, the traumatic effects of the pandemic might not have been assessed completely and accurately. Finally, not including in the survey healthcare workers other than the physicians and nurses, such as the office workers or the cleaning staff who also run the risks of developing the same mental effects of the pandemic, is a limitation.

In conclusion, the results of the study indicate that females, younger adults aged 20-30 years, nurses, and individuals with a history of mental disorder were at greater risk for mental problems, while only the insomnia symptom of the participants working with direct exposure to COVID-19 was significantly higher in comparison to those employed in services excluding COVID-19. The mental health of healthcare workers was severely affected by the pandemic. Protection of healthcare workers is an integral part of the public health measures taken against the COVID-19 pandemic. Close monitoring and early intervention are essential for these high-risk groups.

REFERENCES

Aydemir Ö, Güvenir T, Küey L et al (1997) Validity and reliability of the Turkish version of Hospital Anxiety and Depression Scale. Turk Psikiyatri Derg 8:280-7.

Binbay T, Direk N, Aker T et al (2014) Psychiatric epidemiology in Turkey: main advances in recent studies and future directions. Turk Psikiyatri Derg 25:264-81.

Boysan M, Güleç M, Beşiroğlu L et al (2010) Psychometric properties of the Insomnia Severity Index in Turkish sample. Anadolu Psikiyatri Derg 11:248-52

Cai H, Tu B, Ma J et al (2020) Psychological impact and coping strategies of frontline medical staff in Hunan between january and march 2020 during the outbreak of coronavirus disease 2019 (COVID19) in Hubei, China. Med Sci Monit Apr 15;26:e924171.

Chew NWS, Lee GKH, Tan BYQ et al (2020) A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. Brain Behav Immun; 88:559–65.

Deveci A, Taskin O, Dinc G et al (2007) Prevalence of pseudoneurologic conversion disorder in an urban community in Manisa, Turkey. Soc Psychiatry Psychiatr Epidemiol 42:857-64.

Du J, Dong L, Wang T et al (2020) Psychological symptoms among frontline healthcare workers during COVID-19 outbreak in Wuhan. Gen Hosp Psychiatry 3:S0163-8343(20)30045-1.

Elbay RY, Kurtulmuş A, Arpacıoğlu S et al (2020) Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. Psychiatry Res 290: 113130.

Evren C, Dalbudak E, Aydemir O et al (2016) Psychometric properties of the Turkish PTSD-Short Scale in a sample of undergraduate students. Klinik Psikofarmakol Bulteni 26:294-302.

Guo J, Liao L, Wang B et al (2020, March 13) Psychological effects of COVID-19 on hospital staff: a national cross-sectional survey of China mainland. SSRN Electron J 3550050. downloaded from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3550050 on 20th June 2020.

Huang JZ, Han MF, Luo TD et al (2020) Mental health survey of 230 medical staff in a tertiary infectious disease hospital for COVID-19. Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi, 20;38:192-5.

Huang Y and Zhao N (2020) Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. Psychiatry Res 38:192-5

Lai J, Ma S, Wang Y et al (2020) Factors associated with mental health outcomes among health care workers exposed to Coronavirus disease 2019. JAMA Netw Open 3:e203976.

LeBeau R, Mischel E, Resnick H et al (2014) Dimensional assessment of posttraumatic stress disorder in DSM-5. Psychiatry Res 218:143-7.

Lee AM, Wong JG, McAlonan GM et al (2007) Stress and psychological distress among SARS survivors 1 year after the outbreak. Can J Psychiatry 52:233-40.

Lee SM, Kang WS, Cho AR et al (2018) Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. Compr Psychiatry 87:123-7.

Li Z, Ge J, Yang M et al (2020) Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. Brain Behav Immun 88:916-9.

Liang Y, Chen M, Zheng X et al (2020) Screening for Chinese medical staff mental health by SDS and SAS during the outbreak of COVID-19. J Psychosom Res 133: 110102.

Liu Z, Han B, Jiang R et al (2020, March 24) Mental health status of doctors and nurses during COVID-19 epidemic in China. SSRN Electron J 3551329. downloaded from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3551329 on 20th June 2020.

Maunder RG, Lancee WJ, Balderson KE et al (2006) Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. Emerg Infect Dis 12:1924-32.

Pappa S, Ntella V, Giannakas T et al (2020) Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. Brain Behav Immun 88:901-7

Qi J, Xu J, Li BZ et al (2020) The evaluation of sleep disturbances for Chinese frontline medical workers under the outbreak of COVID-19. Sleep Med 72:1-4.

Remuzzi A and Remuzzi G (2020) COVID-19 and Italy: what next? Lancet 395: 1225-8.

Santarone K, McKenney M, Elkbuli A (2020) Preserving mental health and resilience in frontline healthcare workers during COVID-19. Am J Emerg Med 38:1530-1.

Sezgin AU ve Punamäki R (2020) Impacts of early marriage and adolescent pregnancy on mental and somatic health: the role of partner violence. Arch Womens Ment Health 23:155-66

Sim K, Phui NC, Yiong HC et al (2004) Severe acute respiratory syndrome-related psychiatric and posttraumatic morbidities and coping responses in medical staff within a primary health care setting in Singapore. J Clin Psychiatry 65:1120-7.

Su TP, Lien TC, Yang CY et al (2007) Prevalence of psychiatric morbidity and psychological adaptation of the nurses in a structured SARS caring unit during outbreak: a prospective and periodic assessment study in Taiwan. J Psychiatr Res 41:119-30

Turkish Medical Association (2020, April 22). COVID-19 tanısı almış sağlık çalışanlarının sayısı artıyor. Hükümeti önlem almaya davet ediyoruz! Downloaded at 11.05.2020 from https://www.ttb.org.tr/kollar/userfiles/files/ttbcovid-saglik-calisanlari_-EN-SON.pdf

Türkmen H, Dilcen HY, Akin B (2020) The Effect of labor comfort on traumatic childbirth perception, post-traumatic stress disorder, and breastfeeding. Breastfeed Med 15:779-88.

World Health Organization (2020, March 11). Coronavirus disease 2019 (COVID-19) Situation Report – 51. Downloaded at 11.05.2020 from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_10

Wu Y, Wang J, Luo C et al (2020) A Comparison of burnout frequency among oncology physicians and nurses working on the frontline and usual wards during the COVID-19 epidemic in Wuhan, China. J Pain Symptom Manage 60: e60-e65.

Xiang YT, Yang Y, Li W et al (2020) Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. Lancet Psychiatry 7:228-9.

Yang Y, Li W, Zhang Q et al (2020) Mental health services for older adults in China during the COVID-19 outbreak. Lancet Psychiatry 7: e19.

Zhang WR, Wang K, Yin L et al (2020) Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. Psychother Psychosom 89:242-50.

Zigmond AS ve Snaith RP (1983) The hospital anxiety and depression scale. Acta Psychiatr Scand 67:361-70.