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Post-traumatic stress disorder in healthcare workers of emergency departments during the pandemic: A cross-sectional study

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Abstract

Objective: Emergency departments (EDs) were the first application center for Covid-19 patients, as in almost all diseases. For this reason, a serious mental burden has arisen for ED workers. This study was conducted to determine the possible rate of Posttraumatic Stress Disorder (PTSD) and factors that may be associated with PTSD symptom severity in physicians and nurses working in EDs.

Methods: This cross-sectional study was conducted with a total of 783 participants, including 406 physicians and 377 nurses working in EDs. The PTSD Checklist for DSM-5; Depression, Anxiety and Stress Scale-21; and a structured questionnaire on sociodemographic and work-related characteristics were administered to the participants.

Results: The probable PTSD rate in the total sample was found to be 19.2%. The rate of probable PTSD in physicians (22.9%) was significantly higher than in nurses (15.1%). However, PTSD symptom total scores and PTSD symptom clusters were higher in physicians than in nurses, but there was no difference between the two groups in terms of depression, anxiety and stress levels. High anxiety level, being diagnosed with COVID-19, high depression level, female gender, and having additional chronic disease were predictors of high PTSD symptom severity in physicians. For nurses, high anxiety level, being diagnosed with COVID-19, working with 24-h shifts, high depression level, low work experience (years), low monthly income and having additional chronic disease were the predictors of high PTSD symptom severity.

Conclusion: The results of our study showed that both profession groups are at risk for PTSD, and contrary to the existing literature, this rate may be higher in physicians than in nurses. HCWs in the EDs needed protective and supportive mental health models in terms of PTSD.

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1. Introduction

The worldwide spread of the 2019 coronavirus disease (COVID-19) in a very short time has brought the attention of the whole world to the pandemic [1]. With the sudden increase in the number of patients, the burden of the emergency departments (EDs) has also increased. The healthcare workers (HCWs) in EDs showed great effort and responsibility in this process. The HCWs in EDs were front-line fighters who treated COVID-19 patients and faced the risk of being infected every day [2]. Considering the high probability of being infected, the risk of transmission to relatives and the necessity of being isolated from the family, it is clear that HCWs working in EDs were under serious psychological pressure and stress during the pandemic period [3,4]. Continued exposure to danger, deaths, discrimination and stigma can cause an acute stress response and even post-traumatic stress disorder (PTSD) in HCWs [1].

PTSD is a psychiatric disorder characterized by post-traumatic re-experiencing (such as repetitive images, dreams), avoidance of related people and places, increased psychophysiological reactivity (such as attention-deficit disorder and sleep difficulties); and causing severe loss of functionality [5]. Previous studies have shown that severe acute respiratory syndrome (SARS), the Middle East respiratory syndrome (MERS), and the 2009 novel influenza A (H1N1) outbreaks also adversely affected the mental health of HCWs; and PTSD predominates among them [6,7]. The prevalence of PTSD among healthcare professionals varies widely in epidemiological studies, depending on the target population, course of the pandemic, and methods used to assess the disorder, ranging from 3.4% to 71.5% [8]. Few studies focusing on healthcare professionals working in the emergency department reported PTSD rates of 9.1% [3] and 22.3% [9].

It has been reported that PTSD may be associated with other serious mental health problems such as anxiety, depression and suicide among healthcare professionals simultaneously [10]. Among healthcare
workers, PTSD is highly predictive of reduced quality of care, lost work days, burnout, and ultimately high staff turnover [11-14]. In this study, our aim is to determine the rate of probable PTSD in HCWs working in the EDs during the pandemic, to examine the differences in probable PTSD rates between physicians and nurses; and to define the variables that may be associated with post-traumatic stress disorder symptom (PTSDs) severity in profession groups.

2. Material and methods

2.1. Study design, selection of participants

The study was conducted between December 30, 2020 and March 31, 2021 among the HCWs working in EDs of state and university hospitals affiliated to the Ministry of Health, in Istanbul. The research was approved by the local ethics comitee (Ref: 2020.11.27-73) and was conducted in accordance with the Helsinki Declaration. Inclusion criteria were to be a nurse or doctor working with COVID-19 patients in the EDs. The exclusion criterion was a refusal to participate. While the study was being performed, the number of HCWs working in EDs within the borders of Istanbul was 5539 (2276 physicians, 3263 nurses) and they all were invited to the study via e-mail. The sample size was determined using a web calculator (https://www.surveymonkey.com/mp/sample-size-calculator/), and it was found that 594 participants with a 95% confidence interval and a 5% margin of error would be ideal for the study. Following the signature of an online written informed consent, participants were invited to answer a self-reported online battery of questionnaires made available through the SurveyMonkey platform (https://tr.surveymonkey.com/). The battery of questionnaire, after the signature of an online written informed consent, was composed of three sections. The sections were as follows.

2.1.1. Personal information form

11 items in accordance with the aim of the study take place in the form prepared by the authors. With these items, sociodemographic and clinic features (age, gender, marital status, monthly income, history of psychiatric disorders, additional chronic disease); and job features information such as working experience, weekly working hours, profession groups (physician, nurse) of participants were determined (Table 1). Together with these, information of stressful events that experienced during the COVID-19 period was obtained (being quarantined, being diagnosed with COVID-19).

2.1.2. Post-traumatic stress disorder checklist for Diagnostic and Statistical Manual of Mental Disorders (DSM–5), (PCL-5)

The PCL-5 is a 20-item measure that assesses PTSD symptomatology: intrusions, avoidance, negative alterations in cognitions and mood (NACM), and hyperarousal. Participants responded to the items on 5-point Likert-type scales (0 = not at all to 4 = extremely) in relation to their experience of COVID-19 pandemic, with total scores ranging from 0 to 80 [15]. The Turkish version of PCL-5 was used, which has been shown to be reliable and valid. In this study, used ≥47 as a cut-off point to diagnose probable PTSD [16]. Among the current sample, the PCL-5 and subscales evidenced a Cronbach’s alpha of α = 0.95 for PCL-5, α = 0.88 for intrusions, α = 0.89 for avoidance, α = 0.92 for NACM, and α = 0.93 for hyperarousal.

2.1.3. The Depression Anxiety Stress Scales-21 (DASS-21)

DASS-21 is a 21-item, self-report questionnaire designed to measure the severity of the ranges of depression, anxiety and stress symptoms. Each item of the DASS corresponds to one of the three subscales (depression, anxiety, and stress) with 7 items per subscale. The scale is a 4-point Likert from 0 (never) to 3 (almost always) and evaluates symptoms from last week [17,18]. Among the current sample, the DASS-21 and subscales evidenced a Cronbach’s alpha of α = 0.92 for DASS-21, α = 0.87 for depression, α = 0.80 for anxiety and α = 0.82 for stress.

2.2. Statistical analyses

The descriptive statistics were presented in median values and inter-quartile ranges (IQR; 25% to 75%) for the quantitative variables; and frequencies and percentages for the categorical variables. The chi-square test was used to determine possible differences between groups in terms of categorical variables. Shapiro-Wilk test of normality indicated that the scale scores were not normally distributed in many instances. Consequently, non-parametric statistical tests were used in comparing the results of the profession groups. The Mann–Whitney U test was utilized for comparing the continuous variables among two groups. The median and proportion differences between groups are presented (IQR; 25%, 75%). Multiple linear regression models were used with backward elimination technique to investigate potentially predictive factors for the development of PTSD in physicians and nurses. The variables evaluated were determined as significant variables derived from our results and literature review, in accordance with clinical experience. The variables used for all the models are as follows; age, gender, marital status, marital status, monthly income, history of psychiatric disorders, additional chronic disease, 24-h shifts, work experience (years), weekly working hours during COVID-19 outbreak, being quarantined, being diagnosed with COVID-19, and depression, anxiety and stress scores. The tests for assumptions-linearity, homoscedasticity, and multicollinearity were carried out by the authors (assumptions met). All the analyses were 2-sided with alpha of 0.05 and performed with SPSS statistical software (IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.)

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Table 1: Sociodemographic and work-related characteristics.

| Variables | Total, n = 783 | Physicians, n = 406 | Nurses, n = 377 | p |
|-----------|----------------|---------------------|----------------|---|
| Gender    |                |                     |                |    |
| Female    | 365 (46.6%)    | 172 (42.4%)         | 193 (51.2%)    | 0.013* |
| Male      | 418 (53.4%)    | 234 (57.6%)         | 184 (48.8%)    |    |
| Marital status |            |                     |                |    |
| Married   | 339 (43.3%)    | 161 (39.7%)         | 178 (47.2%)    | 0.033* |
| Unmarried | 444 (56.7%)    | 245 (60.3%)         | 199 (52.8%)    |    |
| Monthly income |        |                     |                |    |
| ≤5 thousand TL | 403 (51.5%)  | 217 (53.4%)         | 186 (49.3%)    | <0.001* |
| 5–10 thousand TL | 311 (39.7%)  | 120 (29.6%)         | 191 (50.7%)    |    |
| >10 thousand TL and above | 69 (8.8%)  | 69 (17.0%)          | 0              |    |
| History of psychiatric disorders |        |                     |                |    |
| No        | 619 (79.1%)    | 307 (75.6%)         | 321 (82.8%)    | 0.014* |
| Yes       | 164 (20.9%)    | 99 (24.4%)          | 65 (17.2%)     |    |
| Additional chronic disease |        |                     |                |    |
| No        | 698 (89.1%)    | 352 (86.7%)         | 346 (91.8%)    | 0.022* |
| Yes       | 85 (10.9%)     | 54 (13.3%)          | 31 (8.2%)      |    |
| 24-hour shifts |       |                     |                |    |
| No        | 70 (8.9%)      | 53 (13.1%)          | 17 (4.5%)      | <0.001* |
| Yes       | 713 (91.1%)    | 353 (86.9%)         | 360 (95.5%)    |    |
| Being quarantined |        |                     |                |    |
| No        | 568 (72.5%)    | 312 (76.8%)         | 256 (67.9%)    | 0.005* |
| Yes       | 215 (27.5%)    | 94 (23.2%)          | 121 (32.1%)    |    |
| Being diagnosed with COVID-19 |       |                     |                |    |
| No        | 597 (76.2%)    | 330 (81.3%)         | 267 (70.8%)    | 0.001* |
| Yes       | 186 (23.8%)    | 76 (18.7%)          | 110 (29.2%)    |    |

IQR: Interquartile range 25%, 75%.

*p* Pearson’s chi-squared test, **p** Mann-Whitney U test.
3. Results

Among 5539 HCWs, 1456 opened the E-mail advertising for the survey and 926 (63.59%) responded. 783 (53.77%) of them who completed the answers for all surveys and worked with COVID-19 patients, were included in the study.

3.1. Sociodemographic and work-related characteristics

As for 783 participants, the median age was 29 years (IQR = 26 to 34 years) and 365 (46.6%) of them were female. The number of physicians was 406 (51.9%) and the remaining 377 (48.1%) were nurses. The median (IQR) ages of both groups were the same [29 years (IQR = 26 to 34 years). The median work experience of physicians was 5 years (IQR = 2 to 9 years) and nurses was 9 years (IQR = 5 to 14 years) and the difference between groups was statistically significant (p < 0.001).

The median weekly working hours during the COVID-19 pandemic were 50 h (IQR = 45 to 60 h) for physicians and 60 h (IQR = 55 to 60 h) for nurses; the difference between groups in weekly working hours was also statistically significant (p < 0.001). Of all participants, 164 (20.9%) had a history of psychiatric disorders; 99 (24.4%) of them were physicians and 65 (17.2%) were nurses, and there was a statistically significant difference between the groups (p = 0.014). 94 (23.2%) of physicians and 121 (32.1%) of nurses were quarantined; 76 (18.7%) physicians were diagnosed with COVID-19 and this was 110 (29.2%) for nurses. The proportion of nurses were significantly higher than physicians in both variables (p = 0.005, 0.001; respectively). The sociodemographic and work-related characteristics of the participants were shown in Table 1.

3.2. Post-traumatic stress disorder and depression-anxiety-stress levels

When the cutoff value of PCL-5 is 47 and above; 93 (22.9%) physicians and 57 (15.1%) nurses were found to have probable PTSD. The rate of PTSD in physicians was significantly higher than in nurses (p = 0.006). The median PCL-5 total score was 35 (IQR = 28 to 46) in physicians and 32 (IQR = 26 to 32.5) in nurses. The difference between groups for PCL-5 total score was statistically significant (p = 0.004). When PCL-5 subscales were evaluated in the order of physicians-nurses; intrusions was 7 (IQR = 5 to 11) - 6 (IQR = 3 to 10), avoidance was 3 (IQR = 2 to 5) - 2 (IQR = 1 to 4), hyperarousal was 11 (IQR = 8 to 13) - 10 (IQR = 8 to 12) and the differences were statistically significant between physicians and nurses in these subscales (p = 0.001, p = 0.001 and p = 0.017; respectively); there was no significant difference between the groups in terms of negative alterations in cognitions and mood (NACM) (p = 0.757). Also, there were no significant differences between physicians and nurses for the DASS-21 scale and its subscales (p > 0.05 for all). The psychometric properties for self-rating scales and subscales of participants were shown in Table 2.

3.3. Predictors of PTSD

According to multiple linear regression analyzes; high anxiety level, being diagnosed with COVID-19, high depression level, low work experience (years), low monthly income and having an additional chronic disease were predictors of high PTSDs severity in physicians (Table 3). For nurses, high anxiety level, being diagnosed with COVID-19, working with 24-h shifts, high depression level, low work experience (years), low monthly income and having an additional chronic disease were the predictors of high PTSDs severity (Table 4).

4. Discussion

HCWs in EDs are at the forefront of managing and preventing the pandemic, and with this challenging task, they continue to manage other critical emergency cases either. It is of great importance to protect the mental health of HCWs working in the EDs due to the difficult working conditions. Therefore, in this study, we aimed to determine the rate of probable PTSD in physicians and nurses working in EDs and to define the factors that may be associated with PTSDs severity in these two professions. In our study, the probable PTSD rate in the total sample was found to be 19.2%. In meta-analyses dealing with studies conducted during the COVID-19 pandemic, PTSD rates of HCWs were reported to be 26.9% [1], 20.2% [19], 9% [20], and between 3.4% and 71.5% [8]. This shows us that there may be a worrying level of PTSD in high variability among HCWs during the COVID-19 pandemic.

Another finding of our study was that the rate of probable PTSD in physicians (22.9%) was significantly higher than in nurses (15.1%). However, PTSDs total scores and PTSDs clusters were higher in physicians than in nurses, but there was no difference between the two groups in terms of depression, anxiety and stress levels. The number of studies focusing on HCWs in EDs during the COVID-19 pandemic is still few [9,19]. In a study conducted with 1300 emergency physicians, the probable PTSD rate was reported as 22.3%, similar to our findings [9]. In another study conducted with 14,825 emergency physicians and nurses in 31 provinces of China [3], the probable PTSD rate was reported as 9.1%, unlike our results. The authors were stated that the low PTSD rate may be related to the timing of the study, that the pandemic was under control in China at that time [3]. Contrary to our results, it has been reported that nurses are associated with a higher risk of PTSD than physicians in both SARS, COVID-19 pandemics and studies conducted outside the pandemic [3,21-23].

The methodological differences between the studies, traumatic experiences that we did not address in this study during the pandemic, higher working experience of nurses than physicians in our study sample [8], the female dominance of the

Table 2

Psychometric properties for self-rating scales and subscales.

| Scales                  | Total         | Physicians n = 406 | Nurses n = 377 | p          |
|------------------------|---------------|--------------------|----------------|------------|
| PCL-5 cut off score, n (%) |               |                    |                | 0.006      |
| ≥47                    | 150 (19.2)    | 93 (22.9)          | 57 (15.1)      |            |
| ≤47                    | 633 (80.8)    | 313 (77.1)         | 320 (84.9)     |            |
| PCL-5 total score, median (IQR) |       |                    |                | 0.004      |
| Intrusions             | 34 (27–44)    | 35 (28–46)         | 32 (26–32.50)  |            |
| Avoidance              | 7 (4–10)      | 7 (5–11)           | 6 (3–10)       | -0.001     |
| Hyperarousal           | 3 (2–4)       | 3 (2–5)            | 2 (1–4)        | 0.001      |
| NACM                   | 14 (12–17)    | 14 (11–18)         | 14 (12–17)     | 0.757      |
| DASS-21 total, median (IQR) |         |                    |                | 0.017      |
| Depression, Median (IQR)| 20 (16–26)    | 21 (15–26)         | 20 (16–25)     | 0.411      |
| Anxiety, Median (IQR)  | 10 (7–12)     | 10 (7–12)          | 10 (8–12)      | 0.354      |
| Stress, Median (IQR)   | 6 (4–9)       | 6.50 (4–9)         | 6 (4–8)        | 0.072      |

IQR: Intertquartile range 25%; 75%; PCL-5: Posttraumatic stress disorder checklist for DSM-5; NACM: Negative alterations in cognitions and mood; DASS-21: Depression, Anxiety and Stress Scale - 21 Items.
The findings of the study may not be generalizable to other healthcare workers in different settings, due to time constraints and the high workload caused by the pandemic. The nature of online surveys may lead to possible response bias. The study covering hospitals in a single province, relationship, not causality, may be implied. Respondents may have hesitated to complete the survey due to time constraints and the high workload caused by the pandemic and this can lead to possible response bias. The nature of online surveys may cause response bias, which may have affected the measurements. The diagnosis of probable PTSD was not supported by a structured diagnostic interview. Since only HCWs in the EDs were investigated, it would be difficult to draw conclusions in terms of comparison with HCWs in other departments. The relationship between PTSD and factors related to working conditions in nurses, regardless of gender, comes to the fore. The COVID-19 pandemic has created an environment of high stress and uncertainty for healthcare professionals. It is seen that working for long hours in this environment may cause nurses to develop more stress symptoms. In our study, experienced nurses reported fewer stress symptoms than inexperienced ones. This can be explained by the fact that years of working contribute to the gain of resilience and the development of adaptive coping mechanisms. In addition, nurses with a higher income feel economically secure because they have more savings. This can be a facilitating factor in coping with increased workload and stress. When these findings of our study and the results of previous studies are evaluated together, working with 24-h shifts, low work experience (years), low monthly income are seen as important variables for studies of PTSD preventive interventions in nurses [3,26,27].

### 4.1. Limitations

This study had some limitations. Since the study is a cross-sectional study covering hospitals in a single province, relationship, not causality, may be implied. Respondents may have hesitated to complete the survey due to time constraints and the high workload caused by the pandemic and this can lead to possible response bias. The nature of online survey studies may cause response bias, which may have affected the measurements. The diagnosis of probable PTSD was not supported by a structured diagnostic interview. Since only HCWs in the EDs were investigated, it would be difficult to draw conclusions in terms of comparison with HCWs in other departments. The findings of the study may affect the burden of PTSD and factors associated with it.
5. Conclusion

The results of our study showed that both profession groups were at risk for PTSD, and contrary to the existing literature, this rate may be higher in physicians than in nurses. In addition, this study emphasized the relationship between PTSD and the variables that will cause the life threat to be perceived excessively in both profession groups and revealed important data on this subject, which has been discussed again recently [28]. In particular, the relationship between work-related variables in nurses and PTSD was a guide for mental health preventive models. Finally, it showed that physicians and nurses working in the EDs needed protective and supportive mental health models in terms of PTSD.

Meetings

This article has not been presented in any scientific meetings. We don’t have any manuscript already published from the study.

Availability of data and materials

The authors agree to the conditions of publication including the availability of data and materials in our manuscript.

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Informed consent

Online informed consent was obtained from all individual participants included in the study.

Ethical approval

This study was approved by the local ethics committee (University of Health Sciences, Hamidiye Clinical Research Ethics Committee. Decision date: 27.11.2020, Number: 2020.11.27–3).

Human rights

The principles outlined in the Declaration of Helsinki have been followed.

Declaration of competing interest

Authors declare that they have no conflicts of interest.

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