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Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics

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ABSTRACT

Aim: To investigate anxiety, stress, and depression levels of physicians during the Covid-19 outbreak and explored associated factors in both clinical and general site.

Methods: An online survey is conducted to asses psychological responses of healthcare workers and related factors during Covid-19 outbreak. It is consisted of three subsections covering the following areas: 1) sociodemographic data 2) information on individuals` working condition 3) Depression Anxiety and Stress Scale-21 (DAS-21).

Results: Of all 442 participants, 286 (64.7%) had symptoms of depression, 224 (51.6%) anxiety, and 182 (41.2%) stress. Being female, young, and single, having less work experience, working in frontline were associated with higher scores, whereas having a child was associated with lower scores in each subscale. Factors found to be associated with higher DAS-21 total scores in frontline workers were as follows: increased weekly working hours, increased number of Covid-19 patients cared for, lower level of support from peers and supervisors, lower logistic support, and lower feelings of competence during Covid-19 related tasks.

Conclusions: Our findings highlight the factors which need to be taken into consideration to protect the mental wellbeing of doctors while fighting with a disaster that has major impacts on society worldwide.

1. Introduction

Since December 2019, the world is facing a new contagious disease, Covid-19. It is first described in Wuhan, China and has spread globally in months. The rapid transmission of the disease and increasing influx of infected cases and associated deaths lead to an enormous panic and anxiety in public. In an early study investigating immediate psychological response during Covid-19 epidemic among general population in China, 53.8% of participants rated the psychological impact of the outbreak as moderate or severe (Wang et al., 2020).

Besides psychological aspects of the outbreak on society, healthcare workers (HCWs) are subjected to an additional stress due to engaging directly in the treatment of infected patients and increased risk for contagion, fear of transmission to their families, concerns about health of self and loved ones, feeling stigmatized and rejected and working under extreme pressures. On the other side, the increasing number of cases and disease-related deaths, heavy workload for extended period of time and depletion of personnel protection equipment (PPE) cause emotional and physical burnout over time.

Stress reaction symptoms such as anxiety, depression, somatization and hostility have been reported in about 10% of healthcare workers during and in the aftermath of previous outbreaks (Mak et al., 2009). During a recent epidemic SARS, a study from Taiwan investigated stress reactions among hospital staff and reported 5% suffered from an acute stress disorder, 20% felt stigmatized and 9% reported reluctance to work or had considered resignation (Bai et al., 2004). In another study investigating long term psychological effects of SARS outbreak on healthcare workers, 23% of staff were found to have moderate or severe depressive symptoms in a 3-year follow-up (Liu et al., 2012). More recently, during Covid-19 pandemic, the prevalence of depression, anxiety and stress-related symptoms were found to be 50.7%, 44.7% and 73.4% respectively, among Chinese healthcare workers (Lai et al., 2019). However, the evidence is still scarce and little is known about psychological needs of healthcare workers facing with this global disaster. Therefore, there is an urgent need for more systematic research to understand the psychological effects of Covid-19 outbreak on healthcare workers and related risk and protective factors.

Based on this perspective, here, we aimed to investigate anxiety, stress and depression levels of physicians during Covid-19 outbreak and explored associated factors in both clinical and general site. We hoped,

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our study would provide a better understanding of psychological needs of our colleagues during this disaster and strengthen preparations in safeguarding their mental wellbeing.

2. Methods

2.1. Participants and procedures

A cross-sectional survey was designed to assess psychological responses of healthcare workers and related factors during Covid-19 outbreak. We used an online survey to minimize face to face interactions and to facilitate participation of healthcare workers who work extensively during this emergency period. A convenience sample of physicians were contacted to participate in this study. The survey was shared on various social network groups from different specialities. All respondents provided an informed consent at the beginning of the survey with a yes-no question confirming their willingness to participate in the study. Data was collected between March 10, 2020 and March 15, 2020.

Ethical approval for the study was granted by the ethical committee of Istanbul Medeniyet University with the number 2020/187.

2.2. Survey instrument

Sociodemographic data were collected on age, gender, marital status, specialties, number of children, composition of the household, comorbid medical diseases, history of mental disorders, smoking status, alcohol consumption and time spent daily on social media since the outbreak. Participants were also asked whether they have ever diagnosed with Covid-19 so far.

The Depression Anxiety Stress Scale (DASS) 21 is a self-report tool containing 21 items that assess three constructs: Depression, Anxiety, and Stress (Lovibond and Lovibond, 1995). Each subscale includes 7 statements. Items consist of statements referring to the previous week, respondents are asked to read these statements and rate the frequency of the negative emotions. Ratings are made on a series of 4-point Likert-type scales from 0 (did not apply to me at all/ never) to 3(applied to me very much/ always). Higher scores indicate more severe emotional distress. The validity and reliability studies of the Turkish version of the DASS-21 were performed by Sarıçam et al. in 2018 and it was concluded that the scale was a valid and reliable instrument in the assessment of depression, anxiety, and stress levels. (Sariçam, 2018).

2.3. Statistical analyses

Data were analysed using SPSS version 25 (SPSS Inc., Chicago, IL). In addition to descriptive statistics, we first conducted univariate analyses to explore the associations between psychiatric symptoms and related factors by using either Student's *t*-test and ANOVA test or Pearson`s correlation test. Then, we conducted multiple linear regression analyses to identify the unique contribution of relevant predictors on the DAS total and subscale scores, separately. With this purpose, lifetime psychiatric history and correlates that showed statistical significance at p-value less than 0.05 in the univariate analyses were included in the regression analysis. As work experience and age were highly correlated variables, we only included age as a covariate in the regression analyses to avoid multicollinearity.

All analyses were two-tailed with alpha set at 0.05.

3. Results

3.1. Participant characteristics

442 people participated in the study. Characteristics of the participants are presented in Table 1. The mean age was 36.05 ± 8.69. There were more females than males in the sample (56.8% vs 43.2%). Table 2

Table 1
Characteristics of participants (N:442).

	N	%
Age	36.05 ± 8.69	
Gender		
Female	251	56.8
Male	191	43.2
Marital status		
Married	314	71.0
Single	128	29.0
Having a child		
Yes	250	56.6
No	192	43.4
Household		
Living alone	61	13.8
Living with parents	50	11.3
Living with spouse and children	305	69.0
Others	26	5.9
Smoking status		
Yes	80	18.1
No	362	81.9
Alcohol consumption		
Yes	100	22.6
No	342	77.4
Work experience (years)	11.49 ± 8.96	
Life-time psychiatric disorder		
Yes	67	15.2
No	375	84.8
Medical comorbidity		
Yes	98	22.2
No	344	77.8
Specialty (N:437)[1]		
Surgical specialties	75	17.2
Non-surgical specialties	344	78.7
Basic medical sciences	18	4.1
Covid-19 diagnosis		
Yes	9	2.0
No	409	92.5
Suspected cases	24	5.4
Working with Covid-19 patients		
Yes	231	52.3
No	211	47.7
	Mean ± SD	
DAS-21		
Total	19.04 ± 12.93	
Depression	6.92 ± 4.70	
Anxiety	4.67 ± 4.21	
Sress	7.46 ± 4.85	

DAS-21: Depression, anxiety and stress scale-21.
[1] *Ns varies because of the missing data.*

Table 2
Working conditions of frontline doctors (N:231).

	N (%) or Mean (SD)
Weekly working hours	33.54 (22.10)
Pattern of working hours	
Night shifts (24 hr shifts)	81 (35.1)
Daytime work	47 (20.3)
Both	103 (44.6)
N of patients cared for (total) (N:229) [1]	50.38 (114.02)
Support from peers [2]	2.35 (0.61)
Support from supervisors [2]	2.14 (0.70)
Logistic support [3]	2.45 (1.07)
Occupational competence [4]	3.18 (1.10)

[1] *Ns varies because of the missing data.*
[2] *As measured by a Likert scale. Possible scores range from 0 to 3, with higher scores indicating better support.*
[3] *As measured by a Likert scale. Possible scores range from 0 to 5, with higher scores indicating better support.*
[4] *As measured by a Likert scale. Possible scores range from 0 to 5, with higher scores indicating better competence.*

presents the working conditions of doctors who work in the frontline during this pandemic.

18.1% (n:80) of the overall sample were smokers. Of these, 20 reported an increase, whereas 27 reported a decrease in daily cigarette consumption after the outbreak. 100 people (22.6%) were drinking alcohol in the whole sample. Of these, 17 reported an increase, while 34 reported a decrease in alcohol consumption.

We asked participants to rate their social media usage during the outbreak. 3.6% reported reduced social media use and 19.5% reported no change. However, social media usage was increased in 48.2% and was extremely increased in 28.7% of the sample.

3.2. Results of the depression anxiety stress scale

Mean DAS-21 total and subscale scores of the sample were presented in Table 1. Of all participants, 286 (64.7%) had symptoms of depression, 224 (51.6%) anxiety and 182 (41.2%) stress. For depression subscale, 17.6% of the sample were reported mild depressive symptoms, 27.4% were reported moderate, 9.5% were reported severe and 10.2% were reported extremely severe depressive symptoms. For anxiety subscale, 16.3% of the sample were considered to have mild anxiety symptoms, 13.1% were considered to have moderate, 10.6% were considered to have severe and 11.5% were considered to have extremely severe anxiety symptoms. For stress subscale, 10.2% of the sample were reported mild stress symptoms, 15.6% were reported moderate, 10.4% were reported severe and 5.0% were reported extremely severe anxiety symptoms.

3.3. Factors associated with psychiatric symptoms in the overall sample

The findings of univariate analysis for psychiatric symptoms in the overall sample were presented in *Supplementary Table 1*. Being female, young and single, having less work experience, working in frontline jobs were associated with higher scores, whereas having a child was associated with lower scores in each subscale. Composition of the household was found to be associated with only DAS total and depression subscale scores. Post-hoc analyses revealed that the scores were higher for those who live alone than those living with their spouse and children. Having comorbid medical diseases and having diagnosed with Covid-19 were not found to be associated with psychiatric symptoms.

A multiple linear regression analysis was conducted to ascertain the independent effects of age, gender, marital status, having a child, composition of the household, presence of life-time psychiatric disorder and working position (frontline vs non-frontline) on the DAS-21 total scale score. Female gender, younger age, having a life-time psychiatric disorder and working in frontline positions were independently associated with worse psychiatric outcome (Table 3). Additionally, individual regression analyses were performed to determine the effects of the above factors on DAS depression, anxiety and stress subscale scores. Female gender *($p<.001$ for all subscales)*, young age *($p=.045$ and $p=.004$ for depression and stress subscales, respectively)*, having a life-time psychiatric disorder *($p<.001$ for depression and anxiety subscales and $p=.002$ for stress subscale)* and working in frontline *($p=.02$, $p<.001$ and $p=.002$ for depression, anxiety and stress subscales, respectively)* were all independently associated with each subscale scores, with the only exception is that age was not found to be associated with DAS-anxiety scores *($p=.195$)*.

3.4. Factors associated with psychiatric symptoms in the frontline workers

Associations with DAS-21 total and subscale scores in frontline workers were presented in *Supplementary Table 2*. Factors found to be associated with higher DAS-21 total scores in frontline workers were as follows: increased weekly working hours, increased number of Covid-19 patients cared for, lower level of support from peers and supervisors, lower logistic support and lower feelings of competence during Covid-19 related tasks. The pattern of working hours was also associated with DAS-total scores. Post-hoc analyses revealed that people who work in both daytime and nightshifts had higher scores than those working in daytime or night-shifts only. Multiple linear regression analysis indicated that low support from peers and supervisors and low occupational competence were independently associated with higher DAS-21 total scores (Table 4).

Individual regression analyses on subscale scores were conducted with the same variables and revealed that lower logistic support *($p=.023$)*, lower occupational competence *($p=.006$)* and lower support from supervisors *($p=.022$)* were independently associated with higher DAS-depression scores, whereas lower support from peers *($p=.001$ and $p=.014$ respectively for anxiety and stress scales)* and supervisors *($p=.001$ for both anxiety and stress scales)* were independently associated with DAS-anxiety and stress scores. In addition, higher total number of Covid-19 patients cared for was also associated with higher DAS-stress scores independently *($p=.045$)*.

4. Discussion

The first confirmed case of Covid-19 outbreak has been reported in Turkey on March 11, 2020. As in the rest of the world, a rapid transformation and adaptation process started in the healthcare system and immediate steps were taken in our country, as well. To expand bed capacity for Covid-19 patients, many inpatient units have been converted to Covid-19 related wards. Physicians from different specialties were assigned to work in frontline positions. All non-emergency leaves of healthcare workers has been cancelled for 3 months.

It is surely beyond doubt that this acute and unprecedented crisis

Table 3
Multiple regression analyses on DAS-21 total scores in the overall sample.

	B	SE	*B*	*t*	%95 CI	*p*
Age (years)	−0.19	.09	−0.13	−2.25	−0.36, −0.03	*.025*
Gender [1]	−6.39	1.24	−0.25	−5.15	−8.83, −3.95	*<0.001*
Marital status [2]	1.08	2.54	.04	.43	−3.91, 6.07	*.67*
Having a child [3]	.21	1.84	.01	.11	−3.40, 3.82	*.91*
Household	−1.06	1.15	−0.08	−0.92	−3.32, 1.20	*.36*
Life-time psychiatric disorder [3]	6.00	1.60	.17	3.74	2.85, 9.14	*<0.001*
Working position [4]	−3.92	1.16	−0.15	−3.34	−6.21, −1.64	*.001*

DAS-21 = Depression, Anxiety, Stress Scale-21.
B = Unstandardized beta coefficient; SE = Standard error; β = Standardized beta coefficient; CI: Confidence Interval.
[1] *1 = female; 2 = male.*
[2] *1 = married; 2 = single.*
[3] *0 = no; 1 = yes.*
[4] *1 = frontline; 2 = others.*

Table 4
Multiple regression analyses on DAS-21 total scores in the frontline workers.

	B	SE	β	t	%95 CI
Age (years)	−0.01	.12	−0.003	−0.06	−0.25, 0.23
Gender [1]	−8.93	1.73	−0.32	−5.16	−12.34, −5.52
Life-time psychiatric disorder [2]	2.50	2.18	.07	1.15	−1.80, 6.79
Pattern of working hours	1.50	1.12	.08	1.34	−0.71, 3.69
Weekly working hours	.07	.04	.11	1.64	−0.01, 0.14
N of patients cared for	.01	.01	.09	1.46	−0.004, 0.03
Support from peers[3]	−3.46	1.29	−0.16	−2.68	−5.99, −0.92
Support from supervisors[3]	−3.94	1.21	−0.20	−3.23	−6.32, −1.53
Logistic support[3]	−1.32	.83	−0.10	−1.58	−2.95, 0.32
Occupational competence[3]	−1.71	.76	−0.14	−2.23	−3.21, −0.20

DAS-21 = Depression, Anxiety, Stress Scale-21.
B = beta coefficient; SE = Standard error; β = Standardized beta coefficient; CI: Confidence Interval.
[1] *1 = female; 2 = male.*
[2] *0 = no; 1 = yes.*
[3] *As measured by a Likert scale, with higher scores indicating better* results.

had an inevitable impact on health care workers. Our study confirms the concerns about psychological wellbeing of HCWs and indicates 64.7% of physicians had depressive symptoms, 51.6% had anxiety and 41.2% had stress-related symptoms in the early period of the outbreak in Turkey. In terms of the severity of psychological impact, a considerable proportion of participants had moderate to severe symptoms. In the face of this acutely developing situation, to the best of our knowledge, only one study so far has investigated psychological effects of the Covid-19 pandemic in healthcare workers and our findings are consistent with data reported in this study. The authors found that among 1257 HCWs working in different hospitals in China, 50.4% reported symptoms of depression, 44.6% anxiety and 71.5% reported distress (Lai et al., 2019). Studies during the previous outbreaks also indicate similar results with a high prevalence of psychological symptoms among HCWs (Lu et al., 2006; Maunder et al., 2003; Lee et al., 2007; Chua et al., 2004).

We found that being married and having a child were associated with lower DAS total and subscale scores, whereas being younger and women, having less professional experience and working in the frontline were associated with higher scores in the whole sample. In addition, those living with their spouse and children had lower scale scores than those living alone. Regression analysis showed that being a woman, being young, having a history of psychiatric disorders and working in the frontline were independent predictors for worse mental health outcome in almost all subscales. Similar to our findings, Lai et al. indicated that women and frontline workers had a greater risk for developing adverse psychiatric outcomes during Covid-19 outbreak in China (Lai et al., 2019). In another study investigating the psychological impact of SARS outbreak on hospital employees, younger participants and those worked in high risk locations, such as SARS wards, were more likely to have high PTSD symptoms (Wu et al., 2009). Being single was found to increase the odds of having a high level of depressive symptoms in hospital staff, 3 years after the SARS outbreak (Liu et al., 2012). These factors were found to be independently associated with either total scale score or subscale scores after regression analysis. Our another finding is the excessive workload is associated with psychological symptoms. For this reason, it should be aimed to ensure appropriate working hours, reasonable rest periods and rotating shifts for workers. Logistic support seems to be another associated factor with the mental wellbeing of frontline doctors. Shortage of PPE, unsafe work environment, poor working conditions could result in an increased perception of risk to themselves and increased fear of transmission to their families. This could, in turn, lead to lack of motivation and negative feelings such as desperation and feelings of guilt. Therefore, employers should prioritize ensuring the safety of HCWs and meeting their basic needs. Our findings also revealed peer support and support from supervisors are also associated with psychological wellbeing. Ability to talk to someone about their experiences, discussing the emotional and physical challenges of their work, sharing their concerns with other colleagues may help to reduce the feelings of loneliness and stress. Doctors on duty should be encouraged to talk to each other and support groups should be provided via social media, if needed. Finally, feelings of occupational competence during Covid-19 related tasks seem to be related with the psychological burden of workers. Providing adequate pre-job training on those who will work in the frontline, explaining accurate information on the disease, risk of contagion and ways of protection, establishing systematic diagnostic and treatment protocols with clear guidelines may help relieve stress and increase occupational confidence.

4.1. Limitations

To the best of our knowledge, this is the first study in Turkey investigating psychological impact of COVID-19 outbreak on healthcare workers. However, we recognize several limitations to our investigation. First of all, the study is limited by its cross-sectional nature and lacks longitudinal follow-up. Data collection phase of the study was completed within 6 days. Given the time sensitivity across this emergency situation, we aimed to explore psychological symptoms of physicians and related factors, so that findings of this study would identify immediate needs of doctors and provide a guidance for implementing relevant intervention policies in the early period to protect their mental wellbeing during this struggle. Furthermore, the voluntary nature of the survey might have led to a selection bias and the respondents may not represent well the entire population. Lastly, in order to reach as many participants as possible during this emergency time and to minimize face to face interviews, we used a self-report questionnaire to assess psychological symptoms which did not rely upon diagnostic assessment by mental health professionals. In this study, we only investigated depression, anxiety and stress levels of physicians. However, further studies incorporating social support and PTSD assesment in healthcare workers would undoubtly contribute to the litareture. Notwithstanding the above limitations, findings of this study provide valuable information on early psychological effects of Covid-19 in physicians from different specialties across the country. Most importantly, our findings will assist health authorities worldwide in implementing relevant measures to minimize the psychological effects of the largest pandemic of our time on HCWs.

4.2. Conclusion

Providing mental wellbeing of healthcare workers is crucial for ensuring the sustainability of healthcare services during our struggle with Covid-19. Our findings show that women, young and less experienced people and particularly those working in the frontline positions are in the risk group and should be followed closely. Our study further indicated that the excessive workload (increased total number of patients cared for and increased weekly working hours, working in both daytime and night-shifts), lower logistic support, lower support from peers and supervisors and lower feelings of occupational competence during covid-19 related tasks cause a more emotional impact in physicians who work in the frontline.

Contributors

Involved in design and conduct of the study (RYE, AK, SA, EK); data analysis (AK, EK) preparation and review of the study (RYE, AK, SA, EK); data collection (RYE, SA, EK)

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Declaration of Competing Interest

None.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2020.113130.

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